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The Work of the A.B.C.M.

No one can study Dr. G. C. Clayton's careful and comprehensive review of the work of the Association of British Chemical Manufacturers during the past year without realising the wide area that the Association's activities now cover and the thoroughness by which its work in many directions is marked. Although there has been no particular new development within the past twelve months, the Association is quietly extending its influence throughout the chemical industry and taking effective action wherever it seems to be called for. The cases in which direct intervention is required at present are fortunately few. The only two points exciting attention at the moment are the report of the Patents Committee and the position of the dyestuffs industry. The Joint Chemical Committee, having published its report on the question of patents, has wisely decided to let the controversy proceed before taking any further action, but when it comes to explain its own attitude it will probably be found that the original line adopted was a wise one, and that on the controversial question of medical patents the way out of the difficulty would be found favourable to chemical research workers. On this matter it may be noted that the members of the British Medical Association have refused to commit themselves to the view that it is unethical to take out patents or derive benefits from the sale of rights. The medical profession itself can hardly take up any other view remembering the fees that eminent physicians cheerfully charge for their services to mankind. In the matter of the Dyestuffs Act, an official statement of Government policy is expected at any moment and no useful action can be taken on behalf of the industry until the Government intentions are fully disclosed.

In the course of the discussion at the annual meeting, Mr. R. G. Perry raised a new point, namely, the issue on behalf of the chemical industry of some manifesto of the kind that the bankers recently prepared, but the general feeling was that this matter should be approached cautiously and no precipitate step taken. The Council, however, are authorised to proceed to collect all the necessary details with a view to expressing an opinion on behalf of the chemical industry on the two problems of extending safeguarding and Empire Free Trade. The Association may be congratulated on its election of Dr. E. F. Armstrong to the chair and the executive officers of the Association on the continued vigour and success of the Association's work.

Annual Report on Alkali Works

THE first report of Mr. W. A. Damon, who recently succeeded Dr. T. Lewis Bailey as the chief inspector of Alkali Works, follows much the same lines as these reports for some years back. The number of works registered in 1929 was 1,083 and the number of separate processes 1,975, a reduction of 13 in the number of works and of eight in the number of processes.

No outstanding developments either of plant or processes are recorded in this year's report, but the question of the proper treatment of offensive effluents receives considerable attention. This problem has increased in importance in recent years owing to the introduction of new processes and to the stricter standards applied for the protection of the public, and though the troubles have not yet been solved a considerable improvement is taking place in the conditions.

An important feature of the report always is the latest statistical information relating to ammonia production. The amount of sulphate of ammonia produced in 1929 from gas works was 142,017 tons, as compared with 147,162 tons in 1927. The amount, however, produced in other works, including coke ovens, ironworks, producer gas, synthetic, etc., was 698,466 tons, as compared with 252,425 in 1927. The total production, therefore, has increased from 399,587 tons in 1927 to 840,483 tons in 1929. This increase is obviously due to the growth of the syn-

thetic processes. For the moment it appears that production has outrun consumption and in order to prevent the dropping of prices below an economic level some restriction of output appears to have been decided on. It is estimated that in a year or two the position will have so far improved that the existing plants may be taxed to their full capacity to supply the demands, and, in any case, the present position does not appear to have weakened in any degree the producers' faith in the future of the industry.

Wedgwood

" *These I have loved, white plates and cups, clean gleaming.*"—RUPERT BROOKE.

THE celebrations are over, the lectures finished, the exhibitions closed, the effect of the written papers slowly passing away. Josiah Wedgwood, potter, inventor and man of science, was born 200 years ago : to-day, not only his memory, his precept and example, his manufactures remain with us, but also his very virile descendants. He found potting, like many another craft in which British genius and industry have excelled, a home industry : he left it established as a Staffordshire and national manufacture. With a limited education, starting life with no particular advantages, he became a successful manufacturer, a great scientist, and a man of affairs, especially in connection with the provision of roads and of the Grand Trunk Canal.

He was elected a fellow of the Royal Society for three papers on the pyrometer, his experiments extending over six years, at the same time as Priestley, who owed the distinction to the invention of soda water. Wedgwood was a chemist of the highest order, working both at the practice and the theory of pottery : an unceasing inventor, he had the advantage as his own master of having his ideas properly tried out in practice. Many a young chemist in industry to-day feels the lack of this facility ; there are so many personal difficulties, so much friction and opposition to be overcome before his suggestions receive examination, that he becomes discouraged from making them. Herein, perhaps, lies one explanation why so much that is new comes to us from abroad. The Museum at Etruria contains both his MSS. and many thousands of his trials, and it is to be hoped that some definite use will be made of these.

Wedgwood also loved beauty, and he employed the best artists he could find to do his designs, sparing no expense, as the history of the famous Portland vase exemplifies. A study of the story of the invention of his wares brings out very clearly the perfection of form, of colour, of glaze of his improvement and invention. The first dinner services must have been a wonderful joy and revelation to those accustomed to eat off pewter : as *Don Juan* has it, " Since Eve ate apples, much depends on dinner." We should try to realise a little of the joy which our grandfathers and great-grandfathers felt in their china. Beauty, craftsmanship, had a meaning in the house then. To-day, as D. H. Lawrence says, " A people's loyalty to the beauty of life has been betrayed." We live in a competition of mere acquisition ; the industrial cities are sordid ; our streets and houses are full of unbeautiful things, the result of mass production ; our minds are full of unrest. Such problems are generally beyond the ken of the chemist, but he can at least appreciate their gravity and, when opportunity offers, strive to imitate Wedgwood.

Chemistry at the B.A. Meeting

A GOOD programme has been arranged for the Chemistry Section (C), which is under the presidency this year of Professor G. T. Morgan, at the annual meeting of the British Association at Bristol in September. Professor Morgan will deliver his presidential address on Thursday, September 4, and will deal in it with " A State Experiment in Chemical Research." Professor Morgan should have very much that is interesting to say about the Chemical Research Laboratory at Teddington which, as he recently pointed out, has not yet been officially opened nor given an official title. On the following day there will be a discussion in the same Section on " The Present Position of the British Dyestuff Industry." The subject is necessarily controversial on certain sides, but possibly a discussion in the calmer atmosphere of a British Association meeting may bring forth some new points of view. On Tuesday, September 9, Professor W. M. Travers will describe some new experimental methods for the study of gas reactions and will be followed by Professor M. Semenoff (whose paper is to be communicated by Professor W. E. Garner) on " The Initiation of Combustion." Further communications will be presented by Dr. R. C. Menzies on " The Organic Chemistry of Thallium " and by Dr. F. G. Soper on " The Effect of the Solvent on Reaction Velocity." The whole of the session of Section B on Monday, September 8, will be devoted to a discussion on " Chemotherapy," which will be opened by Dr. F. L. Pyman, and in which we may expect to hear something more about medical patents. In Section M (Agriculture), on Thursday, September 4, a discussion on the influence of fertilisers on the yield and composition of plants will be opened by Sir John Russell, and later the same Section will hear a paper from Mr. A. W. Ling on " Sugar Beet Investigations."

An Economy Manifesto

POLITICAL discussion will take a new turn since the publication last week of a manifesto on economy, signed by eleven leaders of industry and banking, who see grave danger to the nation in a situation which divides the honours of politics between Socialists and Protectionists. The manifesto is an appeal to all parties to consider whether the question of economy is not of greater importance than any other, and calls attention to the danger of side-tracking the subject, if political discussion is confined to the alternatives of Socialism and Protection. It argues that the present rate of public expenditure is fatal to industry and commerce and proceeds to say that, protected or unprotected, British industry cannot survive unless the present burdens are substantially lightened. It says truly that economy is a question of policy and involves a reversal of the policy of interference and control which has characterised all our public actions during and since the war.

Society of Chemical Industry Meeting

Messel Lecture by Lord Brotherton

In continuation of the reports of the early stages of the annual meeting of the Society of Chemical Industry in Birmingham, published in our last issue, we give some notes on the latter part of the week's programme.

On Thursday, July 17, a meeting was held in the Midland Institute for the presentation of the Messel Medal to Lord Brotherton of Wakefield, and the delivery of the Messel Lecture.

Lord Brotherton's Public Work

Dr. Levinstein, in presenting the Messel Medal to Lord Brotherton, said it was founded to commemorate the memory of Rudolph Messel, a very eminent technologist, a Past President of the Society of Chemical Industry, and a great benefactor to the Society. The Medal was founded eight years ago and so far had been conferred on four recipients, the first of whom, Professor H. E. Armstrong, he was pleased to see present. The other three recipients were the late Earl Balfour, the late Lord Leverhulme and Dr. Milliken, the very distinguished American physicist. In asking Lord Brotherton to accept this honour, they were asking him to join a very distinguished company. It was the fashion nowadays in some circles to consider it a crime for a man to be successful in industry. The members of the Society, however, did not share that view, and the Medal was bestowed on Lord Brotherton chiefly because, from small beginnings, by enterprise, by courage, by great industry and by the force of his personality, he had built up one of the most successful chemical industries in the country. Lord Brotherton also knew how to make noble gifts wisely, a difficult accomplishment even to those who owned great possessions, for it implied great qualities of heart as well as of head. A great lover of books, Lord Brotherton had recently made the princely gift of £100,000 for the purpose of a new library at Leeds University, where some day Lord Brotherton's own magnificent collection would be housed, a day which everybody hoped would be long distant. A great part of Lord Brotherton's career had also been devoted to public service, and to that most worthy form of public service, municipal service. As Mayor of Wakefield, Lord Mayor of Leeds, Member of Parliament for Wakefield and now as a peer of the realm, he had done fine public service. Among all the honours which had been bestowed upon Lord Brotherton, he felt that the Messel Medal, which was the highest honour the Society of Chemical Industry could bestow, would not be less welcome because it came from those who were connected with the chemical industry and knew Lord Brotherton's virtues.

Lord Brotherton

A Story of Personal Achievement

Lord Brotherton then delivered the Messel Lecture. He apologised for being unable to say anything that was novel or specially interesting to such a learned audience, and added that as he had to write something he thought it would be as well to write about himself because he did know something about himself, whereas he did not know very much about advanced chemistry.

His original interest in chemistry, Lord Brotherton said, was strengthened by the impressive personality and teaching of Roscoe—of whom he was a pupil—and his inclination for engineering impressed upon him the field of work that lay in chemical industry. In contemplating the chemical industry as a career, it seemed to him that its prosperity depended fundamentally on three things—chemistry, engineering, and economics—and it was on the economic side that there appeared to him to be scope for new effort. This opportunity he found in ammoniacal liquor, which was then being produced at all the gasworks in the country and treated in a rather perfunctory manner. At this time the Germans had appreciated the advantages of sulphate of ammonia as a fertiliser and were using it in large quantities. A measure of success in this direction in this country was quickly attained when, with the financial assistance of his friends, the Dysons of Middlesbrough, he established his first works at Wakefield in 1878, to which ammoniacal liquor from a number of neighbouring gasworks was sent. Eventually, the whole output of sulphate of ammonia went to Hull for shipment to Germany, where it was used by the agricultural community and especially by the sugar beet growers.

Thus the manufacture of sulphate of ammonia was the starting point of his career, and it had remained the standard method of using ammonia. The original process, however, was soon relegated to the background so far as his operations were concerned, because the introduction of the ammonia-soda process by Brunner-Mond at Northwich created a demand for ammonia in the form of a concentrated liquor of 15 to 18 per cent., of which new opportunity he availed himself. This concentrated liquor was made by first driving off most of the carbon dioxide and sulphuretted hydrogen, and then distilling with lime through a reflux condenser. This process gradually replaced the manufacture of sulphate in his own works. A certain quantity of ammonia was also required for the manufacture of muriate of ammonia and in the galvanising and other trades. At this time, considerable quantities of muriate of ammonia were exported to Russia as a table salt.

His first works having been established in the home of the textile industry, it was not strange that the firm responded to the requirements of that trade. There was a demand from the wool washers for an ammonia which would replace other alkalis, but it was essential that the product supplied should be free from sulphides and tarry matter. For this purpose he had already made a limited quantity of pure caustic ammonia by the distillation of ammonium sulphate with lime, and had also supplied sulphate to other manufacturers who produced pure ammonia by the same method. He therefore applied himself to the problem of producing pure ammonia direct from gas liquor without the intervention of ammonium sulphate. The chemical and engineering difficulties arising from the presence of impurities in the original liquor were overcome and a pure solution of ammonia in water manufactured directly from the gas liquor became one of his standard products.

Owing to the success of the centralisation of supplies of ammoniacal liquor at Wakefield, he decided to extend this enterprise by the establishment of factories in Leeds, Birmingham, Glasgow and other places. The whole method had much

in common with rationalisation now so freely advocated, effective control being exercised from one point, although the works were in various parts of the country. Now came a notable opportunity which contributed more than any other factor to the extension of his business. In 1893 an arrangement was made with the late Sir George Beilby by which the Cassel Gold Extracting Co. acquired the rights to a process, which Sir George had worked out and patented, for utilising ammonia as the source of the nitrogen in cyanide by the interaction of ammonia, charcoal, and carbonate of potash. The product so obtained contained over 96 per cent. KCN. At the annual meeting of the Society in Edinburgh in 1894, a conversation between himself and the late Sir George Beilby became the starting point of his technical association with the Cassel Co. The records of his firm showed that they commenced to supply the Cassel Co. with ammonia in 1895 and 14 years later, 1909, the contract quantity had reached 10,000 tons of 25 per cent. liquor ammonia per annum. The Cassel Co. was eventually absorbed by the I.C.I. and the operations transferred to Billingham.

Coal Tar

It would readily be understood that he could hardly consider in the early days the problems attaching to the collection of ammonia liquor from gasworks without coming to appreciate the applicability of somewhat similar methods to the crude coal tar which was produced at the same time, and he might refer to a few products with which he had been principally concerned. Of these a prominent place must be given to creosote for the purpose of preserving timber; to pitch, for the binding of coal into briquettes; to carbolic crystals, for use as a disinfectant, and to naphthalene and anthracene for the colour industry. The systematic study of the chemical and thermal treatment of coal tar and the blending of its fractions with modification of its properties to serve many purposes was only in its infancy. At the moment the position that had to be faced was that the production of coal tar was increasing so rapidly as to exceed demand, but it was hardly to be believed that, properly treated, coal tar could not be made equal or superior to any other available material for the binding of roads or that the other liquid fuel which coal tar provided could not be made to compete with that obtained from other sources.

In a reference to what was done by his firm during the war period, Lord Brotherton said that, at Litherland, trinitrotoluene and, at Stourton and Wakefield, picric acid were made in enormous quantities, whilst a large oleum plant was established at Birmingham. Their output of liquor ammonia was increased to the utmost limits and new plants were established at various places, including Newcastle, Nottingham, Sheffield, and the various shale oil distilleries in Scotland. Another interesting development during the war period in connection with his firm was that in 1917 the Board of Trade offered for sale the works of the Mersey Chemical Co. which had been established in this country by a combination of German colour producing firms for the working of some of their patented processes. These works his firm purchased and had continued manufacturing there to the present day. The range of colours produced had been carefully selected and limited, but the manufacture to which principal attention had been paid was that of sodium hydrosulphite, required in increasing quantities in connection with the bright and fast vat colours.

Factors Commanding Success

If he were asked to-day whether his views differed greatly from those with which he originally set out, his answer would be "No." He recognised the changes that had taken place, but they did not alter his views. He believed that the factors commanding success then remained the same to-day, and he did not see any more hopeful basis for sound industrial progress than the free enterprise of men who would set themselves to the economic production of commodities vital to the world. If a man was working at his own risk he could put forward his energies with perfect freedom. Those were the conditions under which he had worked and which he preferred to day above all others. He had an undiminished belief in the merits of the method of industrial enterprise in which competition, while not economically wasteful, was still sufficient to stimulate effort and to afford the healthy feeling that should exist between competing teams.

There had, of course, been great development of our national chemical industry during the period of his lifetime and he believed its importance was much more justly appreciated by the nation to-day. The Great War impressed upon the community the destructive might of applied chemical science but of not less importance was the illustration afforded at the same time of the forced march of chemical industry to supply the needs of humanity in times of peace.

So far as recent developments concerned the staple industry of his career, nothing appeared more important to him than the production of nitrogenous fertilisers and their distribution over the whole world for increasing the productivity of the soil. It was certain, moreover, that the science of chemistry must continue to play an ever-increasing part in the conduct of industrial operations; there was also a growing tendency to recruit to industry not only those who would bring to it the

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PHOTOGRAPH TAKEN AT THE ANNUAL DINNER

technique of science but others who, trained in the highest centres of learning, would find their places in administration and management.

In conclusion, Lord Brotherton said it was hardly necessary for him to avow his interest in university education and especially in the universities in the industrial regions of the country. He felt certain that they had a great destiny and that under wise guidance they would realise their responsibilities to the industrial world, whilst in no way disregarding the provision of all that refreshed and enlarged the human mind, enriched life and ministered to a cultivated leisure. He had given a brief retrospect of his work and some indication of the aims and principles which had determined his life. The most he could hope for was that he might have given some encouragement to those who were beginning their career in chemical industry and who would have to depend upon their own initiative and perseverance for the realisation of their hopes and the attainment of a satisfactory measure of success.

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A Snapshot of Dr. and Mrs. Levinstein

The Way to Learn History

Dr. Levinstein, at the conclusion of the lecture, said it was not the custom to offer any vote of thanks or appreciation to the Messel Lecturer because in a way the Messel Lecture was the fulfilment of a contract between the Society and the lecturer. (Laughter.) The only satisfactory way to learn history was to learn of events from those who had been fortunate enough to particpate in them. Listening to Lord Brotherton, it was staggering to find the enormous influence which the ammonia-soda process had had in all directions, and he doubted whether, when Lord Brotherton joined forces with the late Sir George Beilby in the Cassel cyanide process, it ever occurred to him that it would profoundly modify the prices of every single commodity in the whole of the world.

The following engraved address was presented to Lord Brotherton with the Medal :—

" The Messel Medal of the Society of Chemical Industry has to-day been presented to you, Lord Brotherton of Wakefield, in recognition of your important achievements in advancing the manufacture on a considerable scale of a large number of chemical products. You have developed the manufactures under your control and supervision so that from small beginnings they have become great and valuable parts of the British chemical industry. You have done much to encourage teaching and training of chemists in your native county and have greatly assisted the University of Leeds to expand and develop in those directions which modern civilisation requires. The Society of Chemical Industry hope that you, who have for so long been one of its prominent members, will accept this Medal as a token of the Society's appreciation of your eminent services."

The address is dated July 17, 1930, and is signed by Dr. Herbert Levinstein (president), Dr R. T. Colgate (hon. treasurer), Dr. E. F. Armstrong (hon. foreign secretary), and H. J. Pooley (general secretary).

Speeches at the Annual Dinner

Lord Melchett on Chemical Industry

The annual dinner was held at the Grand Hotel on Thursday, July 17, Dr. H. Leveinstein presiding. There were about 350 present.

Lord Melchett (the new President of the Society), proposing the toast of the " Society of Chemical Industry," said his family connection with the Society went back to its foundation nearly 50 years ago. His father, who was one of the founders of the Society, was President in 1886 and always took a profound interest in its work. The Society had grown from very small beginnings into an institution covering the entire world and having now a membership of some 4,500 members, which number he hoped was going to be still further increased. The foundation of the Society was an attempt to bring together men who in those days were looked upon as outsiders in the scientific world, those who laboured in the field of applying science to industry. Now, however, the Society had become a large, powerful and universally recognised body of workers in scientific thought in all directions. The division of science into watertight compartments was ridiculous. The distinction between pure science and applied science, between the work of the academician and the practical scientist, had now lost any kind of meaning.

When the Society was started a member of it was looked upon as a money-maker and rather beneath the dignity of a Fellow of the Chemical Society or a Fellow of some other learned body. All that had now disappeared. Fellows of the Royal Society, for example, to-day were not averse to entering the ranks of chemical scientific industry and giving their valuable advice or working in what was formerly looked upon as mere sordid commercialism. That was all to the good. Was it not time that some form of unity or combination was achieved among the multifarious scientific bodies now in existence ? To-day there were no real reasons for segregating science in watertight compartments and keeping them in a kind of purdah of sex, jealously guarded one from the other. The scheme had been adumbrated very often, and it seemed to him to require very little to bring it to fruition, of merging many of the scientific societies and bringing them together if possible in one building so that there could be some general direction and an interchange of information.

He did not know whether he was expected to say anything about the position of the chemical industry. The chemical industry was, in reality, the handmaid of a very large number of other industries and therefore it naturally followed that if there was a general depression of trade throughout the world the chemical industry could not be altogether exempt. Undoubtedly progress had been checked and development hampered recently, but good and bad cycles had always existed and when we were in a bad way we had the advantage of looking forward to a good time instead of, when in a good way, looking forward to a bad time. He would not say that he regarded the present position with joy, but he did regard it with a certain measure of equanimity.

The Need of Unity

Dr. Herbert Levinstein, responding to the toast, agreed with Lord Melchett that there were far too many scientific societies at present. The drawback of that to those who were older was that there was far too much literature to read, whilst to those who were younger the drawback was that

there were too many subscriptions to pay. Some time ago the Chemistry House scheme began to take some definite form, and he most earnestly hoped that with the aid and co-operation of Lord Melchett and other distinguished leaders of the chemical and allied industries, something would be done to have one central building. During the jubilee celebrations, which were to take place next year, it was hoped to have 200 members visiting this country from America and Canada, and it was not without interest that the Americans and the Canadians had decided to make a joint party for this visit.

Dr. F. L. Pyman proposed "The City of Birmingham and the University of Birmingham," to which the Lord Mayor (Alderman Lancaster) and Professor W. N. Haworth responded.

Dr. E. F. Armstrong, F.R.S., proposed "Our Guests," which was responded to by Sir Frank R. Benson and Sir Gilbert Vyle. Finally, the Chairman proposed the health of Mr. George King, the Hon. Secretary of the Birmingham Section.

The Chemistry of Petroleum

Too Few Research Laboratories

At a meeting on Wednesday in the Midland Institute, Dr. A. E. Dunstan gave a lecture on "The Chemical Aspect of Petroleum." Dr. H. Levinstein presided.

Dr. Dunstan said the situation with regard to mineral oil had changed most radically in recent years. New methods of exploration had been devised and a new science, in fact, had grown up within the last year or two, the science of geophysics. As a result it was no stretch of the imagination to predict that we were just at the beginning of the exploitation of mineral oil, and not working towards the end of it. Petroleum, as Lord Fisher said years ago, was the very cream of fuel; transportable, accessible, easily stored and of very high calorific value, and his own chief, Sir John Cadman, had pointed out recently that civilisation in war and in peace was based on ample supplies of liquid fuel. In the last 20 years we had seen a remarkable development of the internal combustion engine and that development had been based on the production of petroleum or gasolene. He remembered being told that in the earliest days of the industry petrol was burned to get rid of it. In those days—and not a generation ago—the only commodity worth getting was kerosene; the petrol fractions were a danger and a nuisance, and were burned in pools or under boilers or any way in order to secure their safe disposal. Then came the 20 years of the petrol engine, but one could almost envisage the end of that period to-day. Those present would, in their lifetime, probably see the end of that period and the invasion of the more efficient and useful Diesel cycle. Indeed, he ventured to predict that in five years time from now we should see on the roads of this country a preponderance of Diesel engine vehicles, and a minimum of petrol engine vehicles. It was no prophecy, also, to say, that the whole success of commercial aviation depended on a safe fuel such as was burned in the Diesel engine.

In the final portion of the paper mention was made of the attempt to produce synthetic products from petroleum, such as acids, aldehydes and various other products. Some of these, said Dr. Dunstan, had succeeded, and products had been obtained for which definite uses had been found. Of these the oxidation of gas oil and kerosene by means of air at an elevated temperature in the presence of a catalyst might be cited. The products obtained, however, by such processes were always mixtures, partly because the original material was a mixture and partly because the oxidation invariably occurred in steps, and each step was represented in the final product. It, therefore, followed that if pure or comparatively pure products were to be prepared from petroleum it was necessary either to select a reaction which resulted in the formation of one specific compound, or set out from a reasonably pure material, "pure" meaning the individual hydrocarbon.

In the course of some general comments, Dr. Dunstan discussed the training of oil chemists, and said that at present there are far too few petroleum research laboratories in this country, and far too few chemists of the right type occupied in the work of investigation.

Dr. Levinstein proposed a vote of thanks to Dr. Dunstan.

Profit Sharing in 1929

16 Schemes in Chemical Industries

Some interesting statistics of profit sharing and co-partnership schemes existing in the various industries of Great Britain and Northern Ireland during 1929 are contained in the current issue of the *Ministry of Labour Gazette*. The total number of such schemes known to have been started in chemical and allied industries is 32, but of these 16 had been discontinued at the end of 1929, leaving 16 still in existence. The firms concerned employed a total of 86,000 workpeople, of whom 31,600 were entitled to participate in the schemes.

The figures for the chemical industries prove to be a very good reflection of industry as a whole. The tables given show that profit-sharing has been tried in a wide variety of industries; in nearly every industry, however, the number of schemes known to have been started is very small in comparison with the total number of firms engaged in the industry; and in all industries taken together nearly one-half of the schemes started have come to an end. The most conspicuous exception is the gas industry, in which a large proportion of the principal company-owned undertakings have introduced schemes; comparatively few of these schemes have been discontinued, and a number have been in operation for twenty years or longer.

Bonuses paid under all the schemes averaged £10 2s. 11d. per head, the highest recorded, and represented an addition to the earnings of the 229,000 employees entitled to participate of 4·8 per cent.

Synthetic Ammonia and Nitrates, Ltd.

Phosphate Plant to Close for Two Months

The phosphate plant at the Billingham factory of Synthetic Ammonia and Nitrates, Ltd., is to close down, it is understood, for about two months, involving the suspension of some 280 employees, and of about 60 others for a shorter period.

For some time this department has not been working in full operation, and the latest step has been necessitated by the present high cost of certain raw materials. It is hoped, however, that when the plant restarts in about two months' time the company will be able to run it at full capacity.

Extension to Brimsdown Power Station

Further evidence of the rapid progress of pulverised fuel firing since its introduction to power stations only six years ago is provided by the order which has just been placed by the North Metropolitan Power Station Co., Ltd., with International Combustion, Ltd., of Africa House, Kingsway, manufacturers of the Lopulco system, for extensions to the Brimsdown Power Station. This system has already been operating for a considerable time in the original station, the company having been main contractors for the five pulverised fuel fired boilers installed in 1927. The new plant will comprise four combustion steam generators of 175,000 to 200,000 lb. per hour evaporation at 325 lb. pressure and 780° F. final temperature, each boiler being unit fired by Raymond-Lopulco Mills. This is the third order for pulverised fuel plant at the Brimsdown Super Power Station secured by International Combustion, Ltd.

Garden Fete for John Benn Hostel Funds

Over £800 was raised for the funds of the John Benn Hostel as the result of a "Fairy Tale Fair" held in the grounds of Blunt House, Oxted, the home of Sir Ernest and Lady Benn, on Saturday last. One of the principal attractions of the Fair, which was opened by the Lord Lieutenant of Surrey, Lord Ashcombe, was exhibition lawn tennis, by a number of Davis Cup players, including Miss Betty Nuthall. For the programme sellers attractive "Bo Peep" costumes had been lent by Kolynos, Ltd., and the helpers at the numerous stalls and side shows were also dressed in appropriate "Fairy Tale" garb.

Another Gift by Lord Brotherton

Following upon the meeting of the Society of Chemical Industry in Birmingham last week, Lord Brotherton has informed the Lord Mayor of Birmingham of his intention to subscribe £2,000 to the Hospitals' Centre Appeal Fund.

The Association of British Chemical Manufacturers

Dr. Clayton's Review of the Year

Dr. E. F. Armstrong presided over the fourteenth annual general meeting of the Association of British Chemical Manufacturers on Thursday, July 10. The retiring chairman (Dr. G. C. Clayton) reviewed the main developments of the year, and a short discussion followed.

THE chairman (Dr. G. C. Clayton) in moving the adoption of the report, said that the membership showed a small decline in actual numbers, but as far as the capital represented was concerned, it covered a wider field, since the amalgamated companies had in most cases continued their membership. The position, therefore, gave no cause for anxiety. Though the number of important firms still outside the Association was small, members were again asked to do what they could to secure new members, in order to make the Association as completely representative as possible, while the additional income would be of material assistance in extending the new activities which the Association had taken up during the past two years. In regard to Council membership, two of those who had been associated with them since the start and had played a prominent part in the work of the Association and in chemical industry had been unable to accept nomination for the coming year—Sir Max Muspratt and Sir Harold Boulton. In order to show its appreciation of their services, the Council had decided to elect them honorary members of Council.

There was nothing to add to the report as regards directories, exhibitions or general publicity, except to mention that as regards chemical exhibitions this country was far ahead of any other. In none of the big foreign fairs was there a chemical exhibit comparable in magnitude, variety or interest with that at the British Industries Fair. It was hoped that the maintenance of a Chemical Section, and the system of conducted tours would finally dispel any mistaken ideas regarding the capabilities of the British chemical industry to produce efficiently and cheaply the multifarious products required by modern civilisation.

Collection of Statistics

For the past few years the Association had supported the Economic Section of the League of Nations by providing it with a short report on the progress of the industry. Unfortunately, very few other countries had seen their way to supply similar reports, the general excuse apparently being that of secrecy. Unless all chemical manufacturing countries of importance were willing to provide the required information, there would appear to be little point in continuing the system. This was fully appreciated in Geneva, and suggestions had been made whereby it might be possible to prepare a combined report which would show the position of the chemical industry in the world as a whole. Such a document should be of great value, but, until the new system of Uniform Customs Nomenclature had been completed and adopted by every country, no headway could possibly be made, since there was such a wide variation in the different countries as to the ambit of the chemical industry.

There had been no legislative measures directed specifically to the chemical industry during the year, and those likely to affect it, such as the Coal Mines Bill and the Hours of Industrial Employment Bill, had been adequately dealt with through the Federation of British Industries in the case of the former and the Chemical and Allied Employers' Federation in the case of the latter. As far as the trading interests of this country were concerned, the tariff position had, if anything, become worse, and there appeared little hope of any mitigation in the near future. The Council had little faith in the tariff truce, as it could not see how the reduction of tariffs, which must be based on negotiations, could be facilitated by a truce which would tie the hands of this country on what, for practical purposes, was a non-tariff basis.

It was gratifying to be able to record further progress in the collection of statistics, as this indicated the growing appreciation of the value of accurate production data and a steady diminution in the fears of manufacturers that their individual trade would be divulged and prejudiced by participation in such schemes. When representations had to be made to the Government on behalf of a section of industry, it was obvious that these must carry far more weight if they could be substantiated by definite facts and figures, and not merely by expressions of opinion. This had become patently clear in the case of the fine chemical industry, and he was glad to note the very thorough arrangements made to collect all the statistical data bearing on the progress of that industry.

As regards the item dealing with "Mr. Thomas and Industry," the Council decided not to make representations to the Government at this stage, but detailed evidence was ready in case they might require to take action at any time. He was glad to report that the assurances mentioned in regard to chemical education had been implemented by the appointment of an organic chemist to the vacant chair at University College. The Council was in full sympathy with the scheme for Chemistry House, and hoped that all members would support it. The present was, however, an inconvenient time to have to raise money in view of the general trade depression, but the ultimate advantages to their industry were likely to be so great that everyone should do what he could to further the success of the scheme.

Safety Rules and Standardisation

The Works Technical Committee was to be congratulated on the progress made in the preparation of Part II of the Model Safety Rules. The task of collecting and digesting the large mass of information, often of a contradictory nature, must necessarily take a considerable time, and it was gratifying to note that the sections dealing with fire and explosive risks had been completed, and would shortly be printed in draft form. It was the earnest wish of the Council that the publication should be made of the greatest utility to their industry, and it was hoped that every manufacturer would study the draft closely and let the Works Technical Committee have the benefit of any observations, amendments or additions likely to improve the document. The French and German Associations corresponding to their own had now definitely agreed to collaborate in the preparation of this work and in other safety activities and to provide all useful information they possessed. The idea underlying this collaboration had been to regard safety in industry as in the same category as medical science, and to ensure the freest and fullest exchange of information, subject only to the limitations imposed by the need for the safeguarding of the confidential details of methods of manufacture. The progress of this co-operation would be watched with the greatest interest.

The Works Technical Committee had also decided to issue, on a trial basis, a safety summary of the nature indicated in the report, and this summary would become a regular feature of their work if it was found that there was sufficient demand for it.

The standardisation of chemical plant was a subject of some difficulty, but the Committee which had been formed was of a very representative nature, and all possible forms of standardisation would be explored. One of the basic ideas was that the request for standardisation must come from the users of plant, that is, the chemical manufacturers, and when they had expressed a desire for any particular type of standardisation, the proposal should be examined in conjunction with the plant makers to ascertain how far it was practicable, and if it was, to put the necessary action in hand.

Patents

The work of the Patents Committee had been of the greatest importance to their industry, and the Committee was to be congratulated on the success of its endeavours to obtain the collaboration of all the chemical bodies and societies, and to secure the acceptance of their recommendations by the councils of these bodies. Thus the Memorandum which they submitted to the Board of Trade Patents Committee was in the name of a Joint Chemical Committee. This was, he believed, the first time that British chemistry had been in a position to speak with one voice on questions of national importance, and it was hoped that this type of collaboration would find extended scope in the future.

The proposals submitted by the committee in regard to medical patents had been criticised in the Press. Practically

all of these criticisms had been based on an incomplete view of the problem, and had neglected or overlooked the relationship that must necessarily exist between chemists and medical men in the discovery and development of new drugs and medicines. Success in such work could not be achieved without the full co-operation of both parties, and the Committee's proposals were directed to a solution which should secure this state of affairs, while at the same time retaining adequate protection for the British inventor and manufacturer. The problem was extremely complex and could not be explained briefly. The Council had decided not to reply to the letters in the Press at this stage, but to wait for the publication of all the evidence given before the Board of Trade Committee, and then, if necessary, to publish its further observations on the subject in the light of all the opinions expressed.

The section of the fine chemical industry indicated the active steps which are being taken to obtain full statistical details regarding the progress made since the passing of the Safeguarding of Industries Act, 1921. While the general political situation did not at the moment call for any definite action by the Association, it was well to have a full statement of their case ready which could be used for propaganda or other purposes when the need arose.

Position of the Dyestuffs Industry

The position of the dyestuffs industry was now engaging the active attention of the Council, since the present Act was due to expire on January 14, 1931. The Dyestuffs Industry Development Committee of the Board of Trade, on which both the dyemakers and users were represented, had been engaged for some time in the preparation of a report which would be a statement of fact to show the progress which the industry has made under the Act. At the same time, Group IX had prepared a memorandum on the subject from their point of view, and this had now been accepted by the Council. The Dyestuffs Act of 1920 was passed to protect a key industry of vital importance to national prosperity and safety. There had been many industrial and other difficulties to encounter since 1920, but in spite of these the Act had largely succeeded in achieving its main object, and as a consequence we had a well-organised, technically efficient and virile industry. No other form of protection would probably have achieved the same result. The following facts testify to the progress made :—

1. The 1929 production was over six times that of 1913 by weight.
2. The home production represents 90 per cent. of the home consumption by weight and 74 per cent. by value.
3. The British industry affords a more extensive range of colours than any country except Germany and Switzerland.
4. Prices have now been reduced to a level at which the burden on the consuming industries is negligible.
5. The industry has been an important competitive instrument in reducing the price of dyes.
6. British dyes are now admitted to be fully equal in quality to any foreign competitive products.
7. The British industry has played a prominent part in the discovery and development of new products.
8. An expanding export trade is being secured.
9. The industry employs a larger proportion of technically trained men than probably any other manufacturing industry in this country.

While a sound foundation had been laid, and a strong structure was steadily being erected on efficient lines, there was still considerable headway to make before the industry could withstand unaided the intensive foreign competition and price cutting which would result if the Act were allowed to lapse. The removal of the present protection would jeopardise the consummation of the work which it was the object of the Act to achieve without any countervailing gain to the consuming industries which would make the risk worth while; in other words there would be nothing to gain and everything to lose. They would, therefore, press for a further period of protection on the lines of the present Act. Negotiations with the colour users, whose co-operation was of the greatest help in the passing of the Act and in its administration, were being opened with a view to securing a scheme of joint action.

He had nothing special to say on the subject of the wood distillation industry, the tar industry, contracts, or chemical trade, except to record satisfaction at the election of Sir Harold Boulton as the first President of the British Wood Preserving Association, which he had been instrumental in forming. The Traffic Committee had continued to perform valuable work for the Association in spheres in which immediate and direct financial benefits were derived from its successful representations.

General Discussion

After Mr. C. A. Hill had seconded the adoption of the report, and the honorary treasurer (Mr. E. V. Evans) had made a statement with regard to the accounts, a general discussion followed.

Dr. E. F. Armstrong commented on the reception which the report of the Patents Committee had received in the Press, and complimented the committee on having dealt with the very difficult problem of medical patents—surrounded as it was by medical etiquette—on tactful and constructive lines. Though their proposals had not gone as far as the critics would have liked, he felt that they would lead to useful results.

He referred, in terms of sympathy, to the serious accident at the works of Hickson and Partners, Ltd., and to the great zeal which Mr. Bernard Hickson, the managing director, had shown on the Works Technical Committee in the study and application of safety measures in the chemical industry. He could think of no firm in which the partners had taken greater care to ensure safety regulations, and he emphasised the opinion that what had happened had been due to causes which were outside any preventive measures which an employer could normally take.

He expressed his disappointment that the present Government had not shown themselves as receptive to science as was originally hoped; as a consequence, legislation had proceeded along well-known lines, and there had been no attempt to solve the very grave problem of the day from the point of view of enlightened scientific progress, using the word "scientific" in both its technical and theoretical aspects; until this was done little progress would be made.

Dealing with the future, he referred to the very important step which had been taken in connection with chemical standardisation, and to the enthusiastic reception which had been given by the various bodies interested in chemistry to the Association's invitation to a conference. He assured the meeting that in drawing up a scheme of organisation in connection with the British Engineering Standards Association, full autonomy would be secured for the chemical interests, and that nothing in the way of hasty standardisation would be attempted. He also referred to the recent activities of the big oil companies, which are tending more and more to bring them into the chemical industry. Partly through the application of hydrogenation to their crude oils, they now had in their cracked gases and certain oil products raw materials of very great potential value for the manufacture of synthetic organic chemicals. He indicated the need for the clear visualisation of these possibilities, and for the close co-operation of the oil interests with the Association in the event of their embarking on a chemical manufacturing programme. He concluded by congratulating the chairman on his most successful term of office, and the enormous amount of progress that had been achieved during that time.

Dr. F. L. Pyman (Boots Pure Drug Co., Ltd.), while explaining that he had been one of the first to criticise the proposals of the Patents Committee in regard to medical patents, expressed his great appreciation of the enormous amount of work which the committee had done.

The Right Hon. J. W. Wilson (Albright and Wilson, Ltd.) stressed the need for fresh efforts to solve the coal problem. We used to boast that we sold enough coal abroad to pay for all the corn that came in. Now we could not sell enough coal to pay for the petrol we imported. A solution of the oil from coal problem would enable this country to return to the position it boasted a century ago.

Attitude on National Policy

Mr. R. G. Perry suggested that the time had come when the Council might turn to the consideration of its affairs in relation to the policy of the Government. He referred to the manifesto that had recently been issued by a number of great bankers, and expressed the view that the producers of the wealth which the banks handled so admirably, namely, the manufacturers

ought also to have some opinions to express. He was not asking the meeting to pass any resolution, but merely, if they wished, to send a message to the new council which would be sitting that afternoon, to suggest that it should consider the advisability of taking steps to ascertain the views of members on the bankers' manifesto.

Mr. F.W. Bain (Imperial Chemical Industries, Ltd.) referred, in connection with Mr. Perry's proposal, to the meeting of the Grand Council of the Federation of British Industries on the previous day at which a resolution was passed unanimously, the purport of which was that a special committee composed of the president and past presidents of the Federation be appointed to take such steps as they thought best to ascertain the views of the members on the points suggested by Mr. Perry. He believed that the intelligence and statistical work which the Association had done during the past two years would be of great assistance in the consideration of this important problem. He urged that there should be no hasty expression of opinion, but that the matter should be carefully investigated to its logical concluison. This question was not going to be settled to-day, to-morrow, next month or in six months. The whole economic system of this country had existed merely because it had paid us. That system would cease to exist when it had ceased to pay us, and this country would always be prepared to adopt whatever scheme appeared likely to pay us. He suggested that the matter should not be put at a higher level than that. Thus he urged that they should prepare their figures with the greatest care, so that they could present to the Federation of British Industries a reasoned case on behalf of the chemical manufacturers.

After the chairman had put the resolution to the meeting, and declared the report and the accounts adopted, the meeting expressed a wish that the council should proceed to collect all the necessary details with a view to expressing an opinion on behalf of chemical industry on the two problems of extended safeguarding and Empire Free Trade.

On the motion of Mr. S. Robinson, seconded by Dr. F. L. Pyman, Feasey Hull and Hornsby were re-elected auditors.

After the reception of the general manager's report on the nominations for council and group committees, Mr. C. A. Hill moved and Mr. R. M. Bewick seconded, a vote of thanks to Dr. G. C. Clayton for his services in the chair during the past two years. This was carried with acclamation and acknowledged by Dr. Clayton. A vote of thanks to the staff, to which the general manager (Mr. Davidson Pratt) replied, concluded the business of the meeting.

Chief Inspector's Annual Report on Alkali Works

Gas Liquor Problems: Noxious Odours from Viscose

We give below some concluding extracts from the annual report of the Chief Inspector of Alkali, etc., Works (Mr. W. A. Damon), first notice of which appeared in "The Chemical Age" of July 19.

Gas Liquor, Sulphate and Muriate of Ammonia

The low selling price of sulphate of ammonia makes its manufacture uneconomic in small units. The tendency, therefore, to concentrate production at the larger works naturally continues, and this has resulted in efforts being directed towards the production of a gas liquor of higher concentration, so as to reduce carriage costs.

There have been a number of instances where attention has had to be called to minor defects in plant and purifiers. There is a quite natural reluctance to spend money on a plant which is hardly paying its way; nevertheless, if the process is to be operated at all, the plant must be maintained in reasonably good order. In this connection one would emphasise that when the margin for profit is very low, the only hope of increasing or maintaining such margin is to keep the plant at the highest pitch of efficiency.

The problem of the disposal of the spent liquor still causes much trouble. The method which appears to be accepted with most favour is that of compensating the flow so as to ensure an equal daily flow throughout the year. This, of course, entails the provision of large storage tanks. Some works are fortunate enough to have old gasholder tanks which can be used for this purpose. A bacterial treatment purifying plant has worked in connection with one sulphate plant, but the results are not held to be satisfactory and the cost of such purification is very high.

Serious complaints having been made against a works in which 0·880 ammonia is produced from gas liquor, special investigations were made. Although it was not possible altogether to exonerate the works (for exception had to be taken to the manner in which certain duties were performed by the processmen), yet it was thought that the real cause of complaint arose from a sewer manhole in the vicinity. This was brought to the notice of the proper authorities and no further complaint has been received.

Three new coke ovens were started during the year. Steam jets are fixed in the ascension pipes, these being used during the charging and levelling of the coal in the ovens. By this means the green gas which escapes at this period is drawn into the purifying system, and thus a potential source of considerable nuisance is avoided. There is still room for improvement in the adaptation of this device, as its operation is not at all times efficient.

In connection with this class of work, some experiments have been conducted in this laboratory with a view to securing some information as to the manner in which chlorine, originally present in the coal, is distributed amongst the products of carbonisation. It has not been possible to enter on anything in the nature of an exhaustive investigation, but some notes on the subject are collected in Appendix V, which, it is hoped, may stimulate interest and lead to further experiments, on a larger scale, in gasworks.

Muriatic Acid (Tinplate Flux)

There is but little to record in the way of change or improvement in this class of work. Plants have been fairly busy during the year, but prices have not been good. Nearly all the works have adopted the method recommended by Dr. Bailey in dealing with the skimmings from the tinning bath. In some instances, the method is not employed in as careful a manner as it deserves, and so the recovery of tin "fume" is not as good as it might be, nor does the residue command such a good price from the smelter. So far as the requirements of the Act are concerned, there is no complaint to be made. The total acidity of the issuing gases has been kept at a very satisfactory figure.

Sulphide Works

It is again necessary to emphasise the importance of dealing adequately with waste hydrogen sulphide. Where this gas is allowed to escape, widespread discomfort is sure to result. A complaint, which was held to be justified, was made against a works for the preparation of precipitated sulphur. Great care and attention to detail is necessary if such a plant is to be operated without offence, and this case indicated the need for more efficient control. The matter was dealt with by the works manager, and it is hoped that there will be no further occasion for complaint. Where oxide or lime beds are used for absorption of hydrogen sulphide, it is essential that these should, in all cases, be placed on a good, hard concrete floor free from cracks.

Venetian Red Works

The sulphurous gases resulting from the roasting of copperas are usually absorbed in a limestone tower in a perfectly satisfactory manner. At one works, however, difficulty has been experienced in getting the escape down to a reasonable figure. The plant is very old and in somewhat dilapidated condition, but by re-arrangement of the system and improvements in the water scrubber, better results have been obtained. Conditions at this works, however, are not yet satisfactory. At two works in the Midlands, scrap iron towers are used with fair success for the absorption of the sulphur oxides. A continuous process, which utilises the "pickle liquor" from galvanising works, is now in operation and is said to give good results.

Arsenic Works

Improvements in the plant referred to in the 1928 Report have proved quite satisfactory, and there have been no further cases of arseniuretted hydrogen poisoning.

Bisulphide of Carbon

There has been much less complaint directed against this class of works lately; this is due to greater care having been taken to prevent the formation of hydrogen sulphide during the process and to deal adequately with such as is unavoidably produced. In one case, oxide beds were found to be insufficient to cope with the volume of gas. These have been replaced by a Claus kiln. In another case, the gases are passed through light seals and explosion boxes to the sulphur burners of a vitriol plant.

Tar Works

There has been a drop of four in the number of works registered. This is due to the continued tendency of gasworks, especially the smaller undertakings, to join the co-operative concerns which aim at the centralisation of tar distillation.

Attention was directed in last year's report to the danger of foul gas being discharged into a cold fireplace. It has been found that a red line painted on the plug of the cock controlling the pipeline is of help in this connection, inasmuch as it makes it easy to see at a glance which cocks are "on" and which are "off." The use of enlarged covers at the pitch outlet of tar stills is much to be commended. One is glad to see that this practice is steadily extending. Much trouble has been caused and great expense incurred by reason of corrosion of tar stills, due, it is thought, to the presence of ammonium chloride. Attempts to remove the ammonium chloride by pre-steaming of the tar have met with a fair amount of success, and work is proceeding on these lines. The matter has been the subject of some experimental work in this laboratory, the results of which are given in Appendix V.

Zinc Works

A complaint of nuisance relating to a zinc works arose from the roasting of zinc blende. The trouble was caused by the workmen, through inefficient operation of the roasters. With more strict supervision, the men have learned that a better output is obtained, together with absence of local escape of gas, by carrying out operations in accordance with instructions.

Benzene Works

This class of works became registrable in 1928. Considerable progress has been made in the adoption of suitable means for the reduction of any disagreeable escape and incidentally such means have often resulted in an appreciable additional recovery of benzene. During the distillation of crude benzole, it is usually necessary to take precautions against the escape of hydrogen sulphide. Actual estimations have been made at two different works and these have shown, beyond doubt, that there is real need to deal adequately with such gas.

Hydrofluoric Acid

Two complaints were received against this class of works. In one case, a better designed and enlarged scrubber was erected and the acidity of the final escape became negligible. In the other case, the installation of a fan was successful in reducing the escape from an average of 0·4 (as sulphur trioxide) per cu. ft. to an average of 0·15. It is desirable that cooling boxes should be provided for the reception of the calcium sulphate residues at the end of the charge. If these are drawn in the open, whilst hot, there is likely to be quite an appreciable amount of fume resulting.

Artificial Silk Works (Viscose Process)

In the report for 1928 (p. 21) a short account of the viscose process was given and the difficulties arising from the evolution of objectionable odours, both from the spinning bath and from the possible intermingling of liquid effluents, were discussed.

On the whole, there has been improvement, and complaints have been less frequent. There is no doubt, however, that the odours are, at times, quite objectionable, although their ill effects have in some cases been exaggerated. In their endeavours to prescribe some means of reducing the trouble, district inspectors have visited all the known works of this class. The problem is common to the whole industry, and if manufacturers would consent to pool their information on the subject in a frank discussion between the chemists employed by the several undertakings, a satisfactory solution would be the more likely to be forthcoming. Unfortunately, the processes are regarded as secret, and a conference, such as that suggested, would probably not meet with approval.

As has already been stated, the noxious odours arise from two main causes:—(1) Gases evolved from the spinning bath and emitted to atmosphere in a very dilute concentration, and (2) gases evolved from the liquid effluents.

As regards the first named, there is no great progress to report, although this does not imply lack of effort. Greater attention might well be devoted to the practical prevention of hydrogen sulphide formation during the actual coagulation of the filaments and, further, there is the influence of carbon disulphide and other volatile sulphur compounds to be considered, for the assumption that the offensive constituent is wholly hydrogen sulphide is not necessarily correct. At a large works in the south, washing of the vitiated air by means of waste caustic soda in a special apparatus is practised. This has resulted in the reduction of the hydrogen sulphide content to the order of 4 or 5 parts per million as compared with a normal figure of 20 parts per million two years ago.

As regards liquid effluent, there has been a marked improvement. Concentration and re-use of spinning bath acid (formerly run to waste) is now being universally adopted. Such procedure not only effects a substantial saving in raw materials costs, but also renders negligible the risk of these liquors coming in contact with other wastes containing sulphide. Viscose residues, if allowed to make their way into the effluent, result in turbidity of the latter and give rise to complaint. Considerable attention is now given to the collection and retention of such residues. At one large works, by the installation of elaborate and costly plant, the whole of the effluent is now so treated as to render it completely innocuous.

Medical Patents

Motion Referred Back at B.M.A. Meeting

A MOTION "that it is ethically undesirable for a registered medical practitioner who makes an invention or discovery in the medical field to derive financial benefit from the sale of the rights or from royalties for the use of them," was referred back at the annual meeting of the Representative Body of the British Medical Association in London on Tuesday.

Dr. H. S. Souttar, London, speaking in favour of reference back, disagreed with the argument that monopoly involved secrecy or hindered research. He said there was no more complete way of ensuring publicity than the present patent law, and he could not agree with the suggestion that a man who devoted himself to chemical research work should not engage in clinical work. He thought members should do all they could to encourage clinical work, but it was useless to pretend to do so and at the same time look sideways at the man who was trying to make money out of his laboratory work.

Dr. Souttar attacked the suggestion of a system of "dedicated patents." He quoted the case of the inventor of the trench mortar, who, he said, spent something like £14,000 on its production. He received that money back after considerable legal discussion, and he believed that about 80 per cent. of that amount was then taken by the income tax authorities, the inventor losing in the end many thousands of pounds. That, he claimed, was the kind of thing they were likely to get from a public trustee. "We want," he said, "to do all we can to encourage individual medical work at the bedside or in the laboratory."

The N.C. Metal Co., Ltd.

AT the annual meeting of the N.C. Metal Co., Ltd., held in London last week, Mr. L. Wiese (chairman) said the patent rights, less proceeds of rights sold, appeared in the balance sheet at £128,750, and the directors believed this to be an asset of considerable potential value. The Coley process applied not only to zinc but to many other metals and materials. As far as zinc was concerned, the exploitation of the rights in various parts of the world had the constant attention of the directors, and every avenue was being fully explored. With the granting of American patents, the process was now fully patented in every important country in the world, and the patents covered the complete process as applied to all non-ferrous metals and materials.

The Chemist and Some Empire Problems

Important Research Throughout the World

Besides an account of the way in which the consumption of Empire produce in the United Kingdom has been steadily advanced, the Annual Report of the Empire Marketing Board May, 1929-May, 1930 (H.M. Stationery Office, 1s. net), provides a notable record of the research by which the chemist and the biochemist are making possible new fields of trade and removing obstacles in others.

SCIENTIFIC research, conducted with the aid of grants from the Empire Marketing Fund, is now in progress in the United Kingdom, in each of the Dominions and in numerous colonies. The range of Empire industries and commodities which these grants are designed to assist is considerable and the essential part which scientists are playing in the development of marketing may be seen from the detailed sections of the Report. The veins of special knowledge and of enthusiasm which are being tapped are not the least enheartening features of the situation. Frequently, the problem is being tackled by a team of workers, closely in touch with one another but scattered through the empire. In all cases, the results achieved are at the disposal of the Empire as a whole.

Grants for Research

A grant of £10,000 per annum for five years is made from the Empire Marketing Fund for the development of the Biological and Agricultural Departments of the University of Cambridge, and substantial grants have also been made towards the maintenance and development of the Imperial College of Tropical Agriculture, Trinidad. The objects of the College are to provide training in the science and practice of tropical agriculture to students intending to become tropical planters, agricultural officers or specialists in different branches of agricultural science, and to offer facilities for the study of tropical agriculture to graduates of other colleges and universities. An important feature of the College is the provision for research which its laboratories and fields afford. Past students of the College are now employed in India, the Union of South Africa, Swaziland, Southern and Northern Rhodesia, East and West Africa, Ceylon, Malaya, the West Indies and other parts of the Empire.

On the advice of the Colonial Advisory Council of Agriculture and Animal Health, the Board during the past year made a grant (£2,000 per annum for five years) to the Government of Mauritius to meet half the recurrent expenditure on a scheme for the development of sugar research. The present scheme provides for the appointment of a senior geneticist, a research botanist strong on the physiological side, and a biochemist and soil physicist. These three officers will be provided with the necessary assistants, and it is intended that this staff shall concentrate on continuous research work and shall not be used for teaching and advisory duties.

An application by the Government of Bihar and Orissa for a grant to meet half the cost of appointing a Marketing Expert in England to supplement lac research being carried out in India was approved by the Board and £500 per annum for five years was allowed.

Much work has already been done on research into the propagation and cultivation of the lac crop by the Lac Research Institute at Namkum, and it is anticipated that research to improve methods of manufacture will shortly be taken up. Research into the standardisation of quality has not, however, yet been started and the first step necessary in this matter is the appointment of an expert in England to keep in touch with consumers, to ascertain their needs and the particular qualities required for each industry, and to arrange for the supply of samples from India and their testing at technical laboratories in England with a view to fixing the standards towards which manufacturers in India should work. It is claimed that the scheme, if successful, would result in increasing the supplies, as well as in improving and standardising the quality, of lac available for export to the United Kingdom.

Low Temperature Research

The extenson of the Low Temperature Research Station, Cambridge, has been completed, and experience has already shown that the enlarged station admirably meets its purpose. For the past two years an intensive study has been made of "bloom" in meat, and during the year under review 31 carcases of mutton, which had been stored in the frozen state for 18 weeks at the Low Temperature Research Station, were shown in Smithfield Market in order to demonstrate how far control of the conditions of storage can preserve the freshly-killed appearance.

In the course of the fundamental investigation into the physiology of fruits which is being carried out at the Low Temperature Research Station, the volatile substance, acetaldehyde, was studied as an intermediary substance in normal metabolism. It was found that traces of this substance in the air inhibited the growth of fungal spores and even killed them, but had no harmful effect on the fruit. This discovery may clearly be of general scientific and economic interest, and is being followed up.

A small canning laboratory has been established at the Low Temperature Research Station, the main purpose of which is to assist in the investigation of the corrosion of tin-plate by foodstuffs. During the investigation of substances which accelerate or retard acid corrosion, a discovery of economic interest was made. It was found that, though certain sugars definitely increased the rate of corrosion, a sample of refined English beet-sugar definitely retarded it. Samples of refined beet-sugar from most of the English factories also exhibited this property, though in varying degrees. The property seems to belong, not to beet sugar itself, but to some unidentified substance present in the mother liquor. The economic interest of the discovery lies in the fact that there has been a tendency on the part of the canning industry to avoid beet-sugar.

Effect of Mineral Fertilisers

Previous annual reports of the Empire Marketing Board have dealt with the investigations into the mineral content of natural pastures which are being carried out on a co-operative basis in different parts of the Empire with general direction from the Rowett Research Institute at Aberdeen and with the aid of grants from the Empire Marketing Fund. At the Rowett Research Institute, where much of the initial work was carried out, experiments are in progress to throw light on such problems as the effect of mineral fertilisers on pasture grass and grass cut or hay, the amount of minerals assimilated and retained by the animal under different conditions, the relative merits of feeding minerals as fertilisers or direct to stock, and the best form in which to feed them. An interesting fact which has come to light is that in the hot, dry areas of the world phosphorus seems to be the element most deficient, whereas in wet, temperate regions, calcium is generally the missing mineral. As a result of past experiments mineral rations have been worked out which form the basis of mineral supplements now added to pig and cattle meal by the main meal manufacturers in the United Kingdom.

In order to test in practice the results of smaller experiments, a special investigation has been carried out in Kenya Colony, where there are large areas of low grade pastures. A team of workers from the Rowett Research Institute was sent to Kenya in 1926. Analyses of samples of soil and herbage from four selected areas were made at the Rowett Institute and feeding experiments were carried out on cattle and sheep in Kenya to obtain a clear picture to the effect on animals of feeding the minerals believed to be deficient. These experiments were completed in the autumn of 1929. The pasture of all four districts was found to be markedly deficient in sodium and chlorine. In one district—Naivasha—the grass was otherwise nearly as rich as a good English pasture; in the other three there were deficiencies in all the minerals and in proteins, but most of all in phosphorus. In certain deficient areas, minerals were given, and the result was a 30 per cent. increase in the milk yield of dairy cows, about 10 per cent. increase in the rate of growth of lambs and about 10 per cent. increase in the fleece weight of sheep. In addition, the general condition of all classes of stock was greatly improved.

In Australia, research work is being conducted at the Waite Agricultural Research Institute at Adelaide, the main part

of which has consisted of a study of the nutrition of sheep, with special reference to the influence of various dietary factors on wool quality. Feeding experiments are being carried out in which the pasture deficiencies are balanced up by salt licks. One of the main deficiencies is in phosphorus, and experiments are in progress to find the most suitable method of administering phosphorus-rich substances. An investigation has been carried out on the iodine content of thyroid glands of sheep. Differences exist in the size of the thyroid and in the percentage of iodine present. This may give indication of whether or not there is an iodine deficiency in certain pastures. A study has been made of the extent to which deficiencies in soils affect the rate of loss of moisture in plants. Plants growing in phosphorus deficient soils lose more water by transpiration than similar plants in the same soil with phosphates added. This result is of great practical importance in connection with drought. If this can be confirmed in the field, it supplies a further and unexpected reason for improvement of pasture by mineral fertilisers. An interesting piece of work allied to the problem of minerals in pastures has been done on a disease, "grey speck," in oast. It has been found that this disease, similar to a wheat disease reported in Denmark, is due to a deficiency of manganese, and can be prevented by the application of manganese salts.

New Zealand

The main investigations in New Zealand, which are being carried out at the Cawthron Institute at Nelson and by the Department of Agriculture, relate to a study of the mineral content of New Zealand soils and pastures. Work on "bush sickness" has been continued, and extended, and it has been shown that applications to the soils of sulphate of iron, and iron plus superphosphate, prevents the disease and keeps animals in excellent condition. In another district, in which sheep did so badly that the land was regarded as being almost worthless, there was a calcium deficiency, and the application of lime to pastures has resulted in marked improvement in the condition of the sheep.

Among other scientific bodies which receive grants throughout the Empire are the Colonial Agricultural Service, the experimental fruit farm and experimental oil palm plantation in Sierra Leone, and bodies engaged in research in Southern Rhodesia, on the citrus industry in Palestine and British Honduras, and the preparation of copra in the Federated Malay States and Fiji. The East African Agricultural Research Station at Amami, which serves as a centre for tropical Africa, is continuing its investigations on the basic types of East African soils, the collection and correlation of data regarding climate and the results of interaction of soil and climate as expressed in the natural vegetation.

Production of Tung Oil Within the Empire

Efforts to Break Down Chinese Monopoly

In view of the importance of Tung Oil to the paint and varnish industry, the need has been felt to free the industry from its sole dependence upon China for supplies of this oil. Plantations have already been started in the U.S.A. and are developing rapidly, and we publish below extracts from a memorandum prepared by the Imperial Institute (H.M. Stationery Office, 1s.) dealing with the possibilities of production within the British Empire.

TUNG Oil, commonly called Chinese Wood Oil, is an essential raw material of present-day varnish manufacture, and its unique properties as a drying oil render it indispensable for certain types of varnish in which tough water-resistant films of high gloss are desired. It is also now widely used as an ingredient of certain types of paint media, and in the manufacture of electrical insulating varnishes. Other industries are also interested, for example, the linoleum industry.

The oil was first introduced in the commercial sense into Western Europe over 30 years ago and reached its greatest development during the war, when it was an essential ingredient of aeroplane paints and varnishes. To-day this oil constitutes one of the chief exports of China, worth approximately three million pounds sterling per annum. There is keen competition for the oil and the price is maintained at a high level because all countries are dependent upon China for supplies, which are often of inferior quality and sometimes adulterated.

The following table shows the value of China's Tung oil exports during five years :—

Exported to	Value in £.				
	1924.	1925.	1926.	1927.	1928.
Hong Kong ..	187,918	71,131	129,295	295,363	335,733
Great Britain	194,695	128,530	156,664	160,718	321,211
Denmark	15,443	9,120	7,694	12,191	18,024
Germany	291,157	215,278	148,407	195,792	138,024
Holland	29,336	35,586	50,261	206,895	83,471
France ..	60,204	47,475	64,658	49,231	55,697
Belgium..	9,708	8,946	10,955	12,325	7,201
Japan....	44,462	19,074	23,832	22,993	25,152
Singapore	1,669	3,040	2,504	2,537	3,439
Italy.....	22,779	15,079	12,059	20,001	18,038
Canada ..	32,358	36,406	107	—	—
United States of America	2,338,831	2,437,752	1,705,072	2,098,821	2,374,806
Australia and New Zealand	4,533	9,701	4,797	162	3,247
Other countries	10,171	7,743	13,850	18,342	20,165
Total ..	3,243,264	3,044,861	2,330,215	3,095,371	3,404,268

Tung oil is obtained from the seeds of *Aleurites Fordii* Hemsl., a tree which grows abundantly in central and western China. Another species, *Aleurites montana* E. H. Wilson, found in south-western China, yields "Mu-yu" oil, which is stated to possess similar properties to those of Tung oil. These two oils, sometimes indiscriminately mixed, are exported from China under the name of Chinese Wood oil. Our knowledge of the distribution of these two species is limited, but there seems to be no doubt that *A. Fordii* furnishes the bulk of the Tung oil exported from China.

There are three other species of *Aleurites* which also bear oil-yielding seeds, namely, *A. cordata* Steud., the source of Japanese wood oil ; *A. triloba* Forst (—*A. moluccana* Willd.), yielding candlenut or lumbang oil, and *A. trisperma* Blanco. Their oils have not the same special properties as those of *A. Fordii* or *A. montana* and cannot replace them in the paint and varnish trade.

Inquiries in Colonies

In view of the increasing demand for Tung oil in the United Kingdom and the fact that commercial supplies come solely from China, inquiries were made by the Imperial Institute in 1917 in India and a number of the Colonies as to the possiblity of cultivation of Tung trees on a commercial scale being taken up with any prospect of success and in several cases supplies of seed were provided by the Institute for trials in suitable localities. Trees of *A. Fordii* grown in Kenya have fruited, and a sample of the seed was recently examined at the Institute and found to give a normal yield of oil possessing the usual chemical and physical characteristics.

The question was taken up again in 1927 by the Advisory Committee on Oils and Oilseeds of the Imperial Institute, and this Committee, in collaboration with the Director of the Royal Botanic Gardens, Kew, and the Director of the Research Association of British Paint, Colour and Varnish Manufacturers, have distributed supplies of seed obtained from China and Florida to the following countries, where experimental cultivation trials are now in progress :—Australia, New Zealand, New Guinea, Fiji, India, Ceylon, British Malaya, Seychelles, Mauritius, Union of South Africa, Kenya, Tanganyika, Nyasaland, Rhodesia, Sudan, Nigeria, St. Helena, Cyprus. Palestine, Bermuda, the West Indies and British Honduras. Although it is too early to say what the results of these trials may be, preliminary reports already received from some of these countries are distinctly encouraging,

especially from North-East India. Independently of these experiments, there are under plantation in New South Wales about 1,000 trees, many of which are now in bearing. This is the result of the distribution of seed from the Royal Botanic Gardens, Kew, to the Botanic Gardens, Sydney.

The production of Tung oil in the Empire is now considered of such importance that on the recommendation of an inter-departmental conference convened by the Department of Scientific and Industrial Research in March, 1929, a special Sub-Committee was appointed by the Imperial Institute Advisory Committee on Oils and Oilseeds to deal with this problem. This Sub-Committee, besides being engaged in encouraging the cultivation of Tung trees within the Empire by the distribution of seed and the dissemination of related information, have arranged for the investigation of cognate problems, the elucidation of which will contribute to the success of this Imperial production. Among these may be mentioned the comparison of the chemical and physical properties of the oils of *A. Fordii* and *A. montana* and the determination of the value of the cake or meal left after the removal of the oil from the seeds as a feeding stuff for animals and as a fertiliser. The widening of the industrial application of the oil is also engaging their attention.

Cultivation in the United States

The first experimental distribution of Tung oil seeds wa made in America by the United States Department of Agriculture in 1905. The trials showed that *A. Fordii* fruited well in certain of the Southern States and were considered so satisfactory that in 1923 the American Tung Oil Corporation was formed as a co-operative effort among the members of the American Paint and Varnish Manufacturers' Association. The object of the Corporation was primarily to prove the suitability of Tung trees as a crop in the hope of encouraging farmers to cultivate them on a large commercial scale. The first two plantations were established in Gainesville, Florida, and were 70 acres and 200 acres respectively in extent. In 1926, the area had increased to 2,500 acres, representing some 200,000 trees, and at the end of 1928 to 4,000 acres; another 1,000 acres were planted during 1929. The total area in Florida now represents 550,000 trees; in addition, 500 acres have been planted in States other than Florida. Some of the trees commenced to bear fruit in 1927, when a crop of about 16 tons was collected. No data are available as to subsequent crops. In January, 1929, an oil-mill was erected at Gainesville, Florida, the first complete plant to be assembled for crushing Tung oil seeds. It is understood that this plant is capable of treating up to approximately 1,000 lb. of seed per hour.

Close Study Needed

The results of trials made in the United States show that the Tung tree (*A. Fordii*) can be grown in countries other than China, and the expansion of the American enterprise suggests that it may prove a remunerative plantation crop. But so far as the British Empire is concerned, though there are records of individual trees that have reached the fruiting stage, the time has not yet arrived for the formation of a definite opinion as to the suitability of particular districts for the formation of plantations of either species. Close study of the conditions in areas in which the climate appears most suitable and experimental cultivation of the trees in these localities are essential.

Some young trees in Florida commence to bear fruit in the third year, though cropping on a commercial basis is not expected until the fifth year. In Florida it is generally held that the trees will reach full bearing in their tenth year, though records of individual trees seem to indicate that progressive production may continue after this age. The oldest trees in Florida are not more than 25 years old and they still appear to be vigorous. Chinese trees are said to give a yield of from 1 to 5 or more bushels of fruit according to their age.

Records for a group of 109 trees nine years of age and over growing in Florida showed that these trees yielded 5,000 lb. (approximately) of dried fruit, equivalent to over 1,000 lb. of oil, in each of two different years. On another plot of 1·9 acres, three-year-old trees produced 1,096 lb. of fruit or 576 lb. per acre, equivalent to 115 lb. of oil. The latest information in respect of Tung oil yields from plantations in the United States is contained in a personal communication to the Director of the Research Association of British Paint, Colour and Varnish Manufacturers from the General Manager of the America Tung Oil Corporation. It is stated therein that the most interesting figures which can be properly authenticated are those of a company in the Gainesville area having 30 acres of well-cared-for trees, which range from five to six years of age. The yields on these 30 acres were as follows:—

1927	9,182 lb. dry fruit
1928	16,421 lb. dry fruit
1929	39,006 lb. dry fruit

Thus at the end of six years, the fruit yield was approximately 1,300 lb. per acre, equivalent to approximately 280 lb. of oil.

Extraction of Oil

Although in America the intention is to crush the nuts for oil near the point of production, as regards the produce of the British Empire it may be preferable in the early days of the cultivation to export the nuts to the United Kingdom for the preparation of the oil. For this purpose the nuts would have to be separated from the fruits and after being dried in the air, if necessary, would be bagged for shipment. The outer husks yield only a very small amount of available ammonia, but their return to the soil would add appreciably to the humus content and this would be an important matter on sandy soil.

The nuts are composed of about 43 per cent. of shell and 57 per cent. of kernel. In the kernels there is about 56 per cent. of oil. The nuts on arrival in the United Kingdom would be crushed by oil-crushers in much the same way as is practised with other oilseeds. The expressed oil would be sold to the makers of paint and varnish and to other firms using Tung oil. It is considered that the English pressed oil would be of lighter colour and of better quality than the Chinese product and moreover it would be of guaranteed purity. The oil would be readily saleable in the United Kingdom and would fetch a price equal to, or possibly a premium over, that of the Chinese oil, which was quoted at £69 10s. per ton in London in January, 1930. The oilcake left after the expression of the oil contains useful amounts of nitrogen, phosphoric acid and potash and could be used, as is now being done in Florida, as a fertiliser.

In the case of many oilseeds, the cake or meal left after crushing the seeds can be used as a feeding stuff for animals, but it is not known whether the cake from Tung nuts is suitable for this purpose.

A point that arises is the influence the increased production will have upon the price of Tung oil. The question has been raised as to whether the larger quantities of oil resulting from the extension of the cultivation of Tung trees in America and the British Empire will have the effect of lowering the price of the oil to such an extent that the cultivation will become unprofitable. The general opinion is that with increased quantities of oil becoming available, new uses will be found for Tung oil and those industries already employing this material will absorb greater amounts. The increased production will naturally tend to reduce the price, but it is considered that the reduction will not be so great as to render the cultivation unprofitable. As far as can be seen, there will always be a demand for Tung oil, and it should always command a price higher than that of linseed oil.

Low Temperature Coal Distillers' Association

THE formation is announced of the Low-Temperature Coal Distillers' Association of Great Britain, comprising the leading firms who are actively engaged in the distillation or carbonisation of coal at low temperatures. The new body will act as a representative association in all negotiations with the Government, the mining industry, the Fuel Research Board, and other official departments concerned, and will also take other measures calculated to promote the interests of the industry as a whole.

It is intended, in the first place, to collaborate with various bodies dealing with the question of smoke abatement; to establish standards for such fuels for all purposes; and to establish an experimental and research department to co-operate with the Fuel Research Board and similar bodies. The chairman of the association is Colonel W. A. Bristow, managing director of Low-Temperature Carbonisation, and the vice-chairman is Lieut.-Colonel. J. T. C. Moore-Brabazon, chairman of L. and N. Distillation.

The International Chemical Fertiliser Industry

By C. C. Concannon

An interesting review of international conditions in the fertiliser industry was contained in the address af Mr. C. C. Concannon, Chief of the Chemical Division of the U.S. Department of Commerce at the sixth annual convention of the American National Fertiliser Association, held at Colorado Springs, Colo. Last week we gave an outline of the points in Mr. Concannon's address, and some longer extracts appear below.

THE fertiliser industry was founded primarily to serve as a salvage outlet for the waste products of other industries. From a lowly start it has grown to be the giant of the chemical industry. It now assembles materials from the atmosphere, the animal, mineral and vegetable kingdoms—processes, compounds and mixes them—and in a short season of about ten weeks distributes the bulk of its 8,000,000 tons of products.

It is reasonable to suppose that the next twenty years will show changes that are now almost impossible of imagination. How will these developments affect the individual fertiliser manufacturer, the mixer, the supplier of materials, the transportation agencies, the banker, stockholder, and, last but not least, the consumer? The answer to the question will depend upon the individual concerned and the plans he is now making for his future existence. It may not be necessary to follow the lead of one firm in the chemical industry which attempts to forecast commercial developments for the next fifty years, but every firm should have a development programme for at least the next three to five or more years.

The world production of inorganic nitrogen in 1929 was approximately two and one-half times that of 1913. This achievement of the nitrogen industry is probably the most significant development in the world's chemical industry during the present century. The success of the pioneer producers of synthetic nitrogen and the apparent desire of every leading nation to be self-sufficient with regard to supplies of nitrogen had led to some overproduction. This has been caused by expansion in several directions. Capacities of the pioneer direct synthetic ammonia plants have been extended and new plants erected. There has been higher recovery of by-product ammonia at coal distillation plants, increased operating efficiency and expansion of cyanamide plants, and production of nitrate of soda in Chile has outstripped consumption.

Inorganic Nitrogen

The world production of inorganic nitrogen reached 2,250,000 short tons in the year 1928-29, a gain of over 20 per cent. in a single year. Much of this output was absorbed by agriculture and industry but there has been some accumulation of world stocks, notably of German synthetic products and Chilean nitrate of soda, these two countries accounting for about 60 per cent. of the world production. The nitrogen situation in the United States is somewhat distinct from that of many European countries in that there has been a more orderly development of fixation plants, and while production has expanded the United States still imports considerable quantities of nitrogen, chiefly in the form of nitrate of soda from Chile. As a corollary to world production it is interesting to note world consumption of inorganic nitrogen which in 1928-29 was estimated at 2,050,000 tons, approximately 14 per cent. more than that of the previous year. The United States and Germany consumed together about 45 per cent. of the world supply.

While production may outstrip consumption temporarily there are vast potential markets for nitrogen that await development. Many farmers in certain countries have found it desirable to increase the use of nitrogen either for greater crop yields, better products, or as a labour saver by maintaining former production levels with less acreage. In the face of rapidly increasing production throughout the world it is but natural that there should arise a desire on the part of some to control and limit production and a step in this direction was the recent international conference of producers in Paris.

If this idea culminates, and there are those who are optimistic as well as those who are pessimistic about the possibility of bringing so many divergent interests into line, there will be set up an international accord which will probably be the world's greatest international cartel.

The futile attempts made some months ago to arrive at an understanding between the Anglo-German-Chilean interests and the Franco-Belgian nitrogen interests clearly showed the difficulties attending any attempt at establishing a friendly working arrangement in this field. Both France and Belgium are among those countries which, for reasons of national defence, since nitrogen is essential for the manufacture of high explosives in war time, decline to consider any and every proposition tending towards limitation of their nitrogen production.

Position of the I.G.

It has been rumoured in Paris that the I.G. Farbenindustrie, or the German Chemical Trust as it is frequently called, and the Imperial Chemical Industries of Great Britain working together do not control a sufficiently large percentage of the world's nitrogen production to impose their views on the other producing countries, and furthermore, the position of the I.G. Farbenindustrie, the world's greatest single producer of atmospheric nitrogen, is not the dominating one that it has been heretofore. The I.G. has been facing for some time past the threat of keen competition on the part of the Ruhr industrialists who are able and seem bound to produce increasing amounts of nitrogen at prices which are reported to be under the cost of production possible in the great plants of the I.G. developed years ago under war-time conditions. True, an agreement has been entered into between these two groups, and the German Nitrogen Syndicate thus controlling the sale of nitrogen produced in Germany has recently been prolonged for a period of seven years, effective July 1, 1930. This Syndicate will include about 98 per cent. of the entire German nitrogen production, total sales last year being approximately 850,000 short tons, and it is easy to see that while this organisation in itself may not be a perfect set-up it, none the less, presents a powerful front to the rest of the world.

Chilean Nitrate Interests

Calcium cyanamide is one of the oldest forms in which atmospheric nitrogen may be fixed. As a part of all these nitrogen developments, a European calcium cyanamide syndicate was formed on May 3, 1930, under the terms of which sales in each country are confined to the domestic producing establishments. European press reports concerning this International Cyanamide Cartel credit the German producers with the idea of bringing together the producers of cyanamide in order to study the situation as it is affected by the growing world production of ammonium sulphate and new nitrogenous products, as well as the possible effect of a new International Nitrogen Cartel. The cyanamide cartel is reported as having decided that intensive propaganda will be necessary to increase consumption in order to speed up cyanamide plant operations, which are now working at about 50 per cent. capacity, and to this end the producers intend to participate in the expense of such a campaign.

The groundwork appears to have been laid fairly well for setting up an international nitrogen agreement which would bring together the producers of so-called natural and synthetic nitrates into one of the most powerful world cartel agreements yet conceived.

If this is ever consummated one of the important factors therein must be the Chile nitrate interests which have recently received prominent mention in the press of the world because of the proposed complete amalgamation of all present nitrate interests in Chile into one huge corporation.

The new company known as Compania Salitrera Nacional, called "Cosana" for short, or, translated into English, "National Nitrate Co.," will have a capitalization amounting to about $375,000,000 and will include all the nitrate producers of Chile, among whom 50 per cent. of the stock of the new company will be divided, with the Chilean Government holding the other 50 per cent., in return for which the Government will abolish the export tax on nitrate and will receive in lieu thereof approximately $20,000,000 annual revenue for the first four years. The plans apparently involve the closing down and scrapping of all existing plants except the present Anglo-Chilean (Guggenheim process) plant, the large Lautaro plant under construction, and perhaps other strategic-

ally located plants which will be built to operate the Guggenheim process on a large scale. Concentration of the industry in a few modern plants will cut the average production costs and it is expected in Chile that more favourable prices will lead to an upward trend in consumption of Chile nitrate.

In line with this effort to cut production costs other rationalisation undertakings are in view, such as, for example, the exportation of the Chilean product in bulk, thereby eliminating cost of bags and cutting the handling costs in transportation. Several experimental shipments have been made with satisfactory results and the significance of this saving is immediately apparent when one stops to realise that the producers of Chilean nitrate paid $6,300,000 in 1928 for bags in which to ship their product.

Effects of Rationalisation

The general economic and political effect of this new Chile nitrate set-up is epoch making. One of its immediate effects is perhaps felt most powerfully by those who have been endeavouring to set up an international nitrogen control. The ability and the desire on the part of Chile to increase production and consumption is not a factor which fits comfortably into any idea which may have for its object world-wide control of production and consumption of nitrogen at a fixed price.

The foreign cartel frequently causes the American business man, at first glance, to worry about competition which he must face and the suggestion is often made that our laws should be changed in order to permit American business to combine in similar fashion. Upon more mature consideration it is realised that action of this kind would be a sign of weakness and would not bring about the desired result. As a matter of fact, statute law in this connection is weaker than economic law, and if there is one thing positive about these monopolies and controls it is that they are not the all-powerful organisations which their originators always hope they will be. The community idea is paramount in Europe and business interests get together to control things. In the United States we have a diametrically opposed economic concept and American individualism and initiative have been, and will always continue to be, fundamental factors in our business and social progress. As President Hoover has so aptly said in speaking of cartels, " They contain within themselves the seeds of their own dissolution."

Phosphoric Acid

Among the fertiliser materials, the place occupied by phosphoric acid derived from phosphate rock cannot be over-emphasised. Although rock is found in many parts of the world, it is the North African phosphates which are having the most important present effect upon the world trade in this commodity. Phosphate rock is a leading item in the trade of Tunisia, Morocco, and Algeria, and so far as Morocco is concerned, it is practically a governmental monopoly, carried on by the French government and with considerable success within the past few years. Heavy shipments of African phosphates during 1929, amounting to over 3,000,000 metric tons from Tunisia, 1,600,000 tons from Morocco, and approximately 900,000 tons from Algeria, led to a dearth of supplies in 1930, with stocks at the mines and in the ports reduced to such a minimum that in many cases vessels were obliged to wait for cargoes. Normal conditions are now being gradually re-established. Even in this field, the cartel idea is in effect and it is reported that the long desired agreement between the Tunisian, Algerian, and Moroccan phosphate mines has been realised as to price, although not as to quantities but it is obvious that the new price agreement may be considered a step toward a general accord embracing the regulation of production as well.

Potash, a member of the triumvirate of essential materials necessary in plant food, has been supplied to the world in years past largely from German sources. To-day 80 per cent. of the American consumption is imported from German and French sources, but the 20 per cent. of domestic production is quite likely to be increased during the current year.

Conditions attending potash developments in various countries of the world are most interesting, and these developments are of the greatest importance from the standpoint of international politics and economics. To appreciate the significance of this last statement we have but to realise that the Franco-German potash accord is the first commercial agreement which was entered into between France and Germany after the war and this international relationship established through potash is the keystone in the arch of subsequent Franco-German trade agreements. The controlling position of France and Germany, acting as a unit in world potash production, has not been changed by recent activities in Russia, Poland, Spain, Palestine, and the United States, where efforts are being made to develop existing potash resources. Much scientific work is being done not only in the field of potash by-products utilization but also in the field of more effective use of potash itself. Most of this work is being done in Germany, and in this latter respect it is interesting to note that the use of potash as a carrier for synthetic nitrogen has been developed on a large scale by the Wintershall interests at prices which permit its use in fertiliser.

France occupies a most strategic position in the international fertiliser picture, controlling the North African phosphate deposits, the potash deposits of Alsace, by-product production of 1,500,000 tons of basic phosphate slag, and more synthetic nitrogen plants than any other country in the world. Any reference to French efforts to develop domestic production of atmospheric nitrogen naturally brings to mind the government-operated nitrogen plant at Toulouse. This plant was designed to produce 150 tons of synthetic nitrogen daily, that is, approximately 52,000 tons per year. But notwithstanding the large amount that has been appropriated by the National Treasury, this plant has made a poor showing to date. Production at the Government-operated plant in Toulouse during the first quarter of 1930 averaged slightly over 55 tons of nitrogen daily, that is, at the rate of 19,000 tons a year, and even though France may have more synthetic nitrogen plants than any other country in the world, domestic nitrogen output is still insufficient, and imports during 1929 included 400,000 tons of Chilean nitrate and 150,000 tons of ammonium sulphate.

French Consumption of Potash

Following the conclusion of the war and the cession of Alsace by Germany, France became an important producer of potash. In this connection it is interesting to note that domestic consumption of this item in agriculture, which was only 60,000 tons (K_2O) in 1913, has risen to the present rate of 240,000 tons annual consumption. If the rate of increase is maintained, France will soon surpass the United States in the use of fertiliser potash.

Unlike France, Germany is deficient in phosphates and over-supplied with nitrogen, and last year used in agriculture alone almost as much nitrogen as the United States used in agriculture and industry combined. Since 1913, agricultural consumption of nitrogen in Germany shows an increase of 143 per cent., potash 67 per cent., while phosphoric acid has remained stationary. Whereas in the United States phosphoric acid forms the base of the fertiliser industry, Germany uses almost 1·4 pounds of potash (K_2O) to each pound of phosphoric acid (P_2O_5) and ammonia (NH_3).

This mention of the relative proportion of use of the three basic fertiliser materials brings out the interesting point, which is generally known, that a preponderance of the material is used which occurs in the greatest abundance in the country under review.

Dermatitis Contracted in Oil Refinery

£150 for Boy of Sixteen

In Bow County Court, on Friday, July 18, before Judge Thompson, Frank Finch, 16 years of age, suing by his father, asked for an award under the Workmen's Compensation Act against Silvertown Lubricants, Ltd., of Minoco Wharf, Silvertown, oil refiners and distillers, in consequence of having contracted dermatitis in his employment. The lad was employed by the respondents as a labourer and in April of last year, he developed a rash on his hands, and Mr. Harry Beadles, the certifying surgeon under the Factory and Workshops Act, gave a certificate that he was suffering from dermatitis, due to the nature of his employment as a labourer. It was stated that the respondents had offered to pay the applicant £150. The boy stated that he was not working at present, but he hoped to be very soon, as his hand had now got well.

Judge Thompson said that in the circumstances, he thought the settlement a good one. He approved it and ordered £30 of the £150 to be paid out of Court, £20 to the father for the expenses he had been put to, and £10 to the boy, and 25s. a week to support the lad until he found work.

U.K. Firms and the Canadian Market

Useful Commercial Information

To assist United Kingdom firms and their representatives in obtaining first hand information regarding the Canadian market, H.M. Senior Trade Commissioner in Canada has recently revised his "Memorandum for the use of British Visitors to Canada." The Memorandum, which is obtainable from the Department of Overseas Trade (Ref. No. C.3290) contains information on a variety of subjects, which should contribute to the personal comfort of the visitor and render him conversant with matters that are common knowledge to American competitors.

Canadian industrial corporations and industrialists in general as a rule purchase their main requirements for six months, the buying for the first half-year being effected from about September to November and for the second half-year during March, April and May. Few of these corporations purchase a year's requirements at one time, although in rare instances this is done.

Representation in Dominion

The best way for a British firm to secure business in Canada is to send a representative, preferably a member of the firm. Alternatively, although a certain amount of business may be obtained by correspondence in a few instances, some form of representation is practically essential if the maximum amount is to be obtained. The following are four schemes for allocation of territory for the purpose of securing adequate representation throughout the Dominion :—

First Scheme.—(*a*) The Maritime Provinces (Nova Scotia, New Brunswick and Prince Edward Island), the present population of which is about 1,000,000. The agent should be established in Saint John or Halifax ; (*b*) Quebec.—This is largely a French-speaking province with a population of about 2,700,000. The agent should be located in Montreal ; (*c*) Ontario.—This is predominantly an industrial province with a population of about 3,300,000. The agent would be in Toronto ; (*d*) The Prairie Provinces (Manitoba, Saskatchewan and Alberta) with a population of about 2,200,000. The agent would probably be established in Winnipeg ; (*e*) British Columbia.—Population about 600,000. The agent would be established in Vancouver.

Second Scheme.—(*a*) An agent in Montreal for the Province of Quebec and the three Maritime Provinces ; (*b*) An agent for Ontario and (*c*) an agent for Western Canada, *i.e.*, British Columbia and the three Prairie Provinces established at Winnipeg or Vancouver.

Third Scheme.—(*a*) An agent at Montreal or Toronto to cover the whole of Eastern Canada, *i.e.*, the Provinces of Ontario and Quebec and the three Maritime Provinces ; (*b*) an Agent for Western Canada as indicated in the second scheme.

Fourth Scheme.—One agent for the whole Dominion. Such agents are usually established in Montreal or Toronto, and have adequate sales staffs to travel from Halifax, N.S. to Vancouver, B.C.

The terms on which the majority of Canadian buyers endeavour to do business are more extended than British manufacturers usually desire to recognise. The majority of Canadian importers of goods handled directly or indirectly through the retailer seek credit of 30, 60 or 90 days, and this is customarily given by American manufacturers. In the face of that condition it is difficult for British manufacturers of such goods to insist on "cash against documents," or, as some do, "cash before shipment." The United Kingdom trader, in order to establish or regain trade, must ascertain the terms and be prepared as a rule to allow equal terms, as regards credit, to those allowed by manufacturers of similar goods in the United States.

Travellers' Privileges

Several privileges are attached to membership of the Dominion Commercial Travellers' Association, application forms for which can be obtained from the Department of Overseas Trade and must be signed by the applicant and the firm which he represents. The application must also be recommended by any two members of the Association. The fee for a commercial certificate is $11.50 for the first year, and the annual fee thereafter is $11. Members are required to travel at least three months of the year in Canada selling goods wholesale.

Travellers holding commercial certificates of the Association are allowed a special rate on the railroads, travelling at 2·06 cents per mile between points in Eastern Canada. Between points in Western Canada, the rate varies according to the district concerned. There is no definite arrangement with the hotels, but a number of them allow a reduction of 50 cents per day on the ordinary rate, and a few allow a dollar per day. Application forms for membership of the Dominion Commercial Travellers' Association may be obtained at the Department of Overseas Trade.

British Chemical Exports to Chile

Big Trade in Soda Ash and Caustic Soda

OWING to the healthy condition of the national industries which use them, the consumption of industrial chemicals in Chile has been larger than in previous years, states Mr. E. Murray Harvey, the British Commercial Secretary at Santiago de Chile, in the course of a lengthy report on *Economic Conditions in Chile* (H.M. Stationery Office, 3s. net).

The effects of changes in the import duties under the new customs tariff of 1928 are now, however, beginning to be felt. Sodium sulphide for tanneries and mineral flotation purposes was previously imported from the United Kingdom, but the duty having been increased tenfold a national factory supplies most of the trade with a lower-grade article. This falling off of sodium sulphide imports is partly offset by the import of caustic soda for the new factory. The duty on imported washing soda is now heavier still, and soda ash is crystallised locally for this trade—a perfectly practical development were it not for the heavy adulteration of the locally-made article with sulphite of soda. Imports of copper sulphate for grain disinfection have fallen off under tariff pressure of recent years, but are now recovering—the local article not being equal in disinfectant value. Additional protection has enabled national producers of sulphuric acid to enter markets previously inaccessible to them owing to the Coastwise Shipping Law, and imports of this article show a heavy fall.

In all potassium salts Germany holds first place. During the last five years the United Kingdom has supplied the greater part of the soda ash and caustic soda consumed in Chile, but this year imports of these two chemicals from the United States have been on quite a heavy scale and prices are much depressed. The British shipments, however, appear to maintain their volume.

Drugs and Colours

The total value of drugs and pharmaceutical products imported during 1928 amounted to £380,000, the United States, Germany and France being the principal countries of supply. Extensive advertising is undertaken ; free samples of foreign remedies, etc., are distributed to the medical profession and to dentists, etc., and in some cases by post to private houses. Certain large drug houses maintain local organisations and in some cases packing plants.

Advertisements of patent medicines and their labels must give particulars of the ingredients they contain.

The importation of paints, both in paste form and liquid, varnishes and enamels, zinc white, turpentine, etc., continues to increase, and amounted in value to some £227,000 in 1928. Great Britain supplies 90 per cent. of the linseed and other oils imported for painting purposes, 72 per cent. of the white lead, and 66 per cent. of the red lead imported. The United States supplied in 1928 about 50 per cent. of the varnishes imported ; Great Britain's share was 32 per cent., and that of Germany 15 per cent. ; the total imports being 124 tons ; 166 tons of enamel paint was imported ; the United States, whose enamels have been consistently and extensively advertised, dominates the market, her share being 73 per cent., Great Britain's 18 per cent., and Germany's about 5 per cent.

Paints prepared in paste form come principally from Great Britain ; of the 2,000 odd tons imported in 1928 Great Britain's share amounted to 80 per cent., that of the United States to 8 per cent., and Holland, Italy, Belgium and Germany supplied the remainder. 468 tons of liquid prepared paints were imported, Great Britain, the United States and

Germany being the principal suppliers in the order named.

The United States and Germany are the principal suppliers of printing inks and Great Britain of writing ink.

Heavy Chemical Imports

The following table shows the imports of the principal heavy chemicals into Chile during 1926, 1927 and 1928, and their countries of origin.

Chemicals.	Year.	Tons.	Importing countries. U.K. %	Balance.
Sodium Silicate	1928	379	64	Germany, Belgium and Holland
	1927	383	40	United States 38%, Holland and Germany
	1926	454	60	Holland, Germany and United States
Sodium hyposulphite..	1928	866	34	United States 40%, Belgium and Germany
	1927	1,032	30	United States 40%, Germany and Belgium
	1926	1,084	40	Germany, Belgium and United States
Calcined sodium carbonate (soda ash) ..	1928	6,601	98	
	1927	4,252	90	
	1926	2,731	80	Germany and United States
Caustic soda	1928	1,905	90	
	1927	1,622	60	United States, Germany and Belgium
	1926	1,811	60	Germany, Belgium and United States
Sulphuric acid	1928	368	20	Germany 35%, Holland 30%
	1927	669	20	United States 40%, Germany 20%
	1926	415	30	Germany 28%, Holland 30%
Sodium sulphide	1928	664	89	Germany and Belgium
	1927	503	55	Germany 20%, Belgium and Holland
	1926	455	40	Belgium and Germany
Sodium salts (various)	1928	941	9	United States 65%, Holland 15%, and Germany
	1927	300	20	United States 30%, Germany 30%, and Belgium
	1926	347	21	Germany 56%, United States and Belgium
Sodium bicarbonate ..	1928	637	80	Germany and United States
	1927	397	90	
	1926	252	91	Germany
Alkaloids (various) ..	1928	550	10	Germany 40%, Japan and France
	1927	1,141	5	Germany 60%, France 25%
	1926	1,096	1	Germany 70%, France 18%, Switzerland 6%
Potassium salts (various)	1928	150	70	Germany and United States
	1927	345	—	United States 60%, Germany 20%, and Holland
	1926	358	3	United States 50%, Germany 40%
Potassium Chlorate ..	1928	20	—	Germany 75%, and United States
	1927	83	—	Sweden 65%, Germany 30%
	1926	221	—	Germany 60%, Sweden 30%
Calcium carbide	1928	7,700	—	Germany 30%, Norway 30%, and United States
	1927	4,280	—	Norway 45%, Germany 30%
	1926	5,039	10	Norway 40%, Germany 30%, United States 20%

Pollution and Unemployment

To the Editor of THE CHEMICAL AGE.

SIR,—At a recent conference of Midland authorities at Warwick, when a survey of the River Avon was discussed, the Chairman (Dr. E. C. Jee) who is technical adviser to the Ministry of Agriculture, is reported as saying that to call upon certain towns to take action to prevent pollution would be expensive. "We must hold our hands until money becomes a little easier and then we may make a little headway. We are now marking time."

I have no wish to criticise Dr. Jee, whose admirable work in fighting pollution is well known. No doubt his remarks in the present case accurately represent the official policy. This policy might be fully justified if there were any visible tendency to cut down public expenditure, but in fact, various members of the cabinet are exercising their brains to find reasonably justifiable methods of spending money to relieve unemployment. From this point of view a period of depression is the most suitable time for undertaking public works. Most of the money spent on any form of public work to prevent river-pollution goes in wages and all of the material employed should be produced in this country. Surely then, this form of relief work, so urgently needed all over England, should be one of the first to be considered. It may be that local authorities at such a time as the present naturally shrink from increasing their expenditure, but this difficulty might be largely overcome if grants in aid from State funds were available, a principle already admitted in the case of road-construction. If a fraction of the money now lost on unemployment "dole" could be spent on wages for work to prevent pollution, more than half the battle would be won which the Pure Rivers Society is fighting in defence of the public health and the amenities of our country.—Yours, etc.,

THOS. W. GOMM

July 18. (Hon. Secretary, The Pure Rivers Society).

Belgian Chemical Industry

Post-War Development

THE development of the Belgian chemical industry since the war has been little short of phenomenal, and is still continuing, states the British Commercial Secretary at Brussels in the course of his recent Report on Economic Conditions in Belgium (H.M. Stationery Office, 3s. 6d. net).

The movement, which has been supported by the leading banks, has tended towards concentration, specialisation and the manufacture of new products for which Belgium was formerly dependent on foreign countries. Up to the year 1918, although many works had chemical laboratories for the analysis of their raw materials, the industry possessed no research laboratories. This has been remedied in the course of the tremendous expansion carried out since the armistice. Concentration has been unusually rapid, and producers may now be roughly grouped under the following headings:—(1) national producers whose chief business is the manufacture of chemicals. (L'Union Chimique is the most outstanding example of this class. In the course of last year this company increased its capital from 175 to 192 million francs, and included in its group many additional companies. It has also interested itself financially in a number of companies abroad); (2) consumers who produce chemical fertilisers for their own use, such as the "Boerenbond" or Farmers' Union; (3) metallurgical works and coke ovens which treat large quantities of by-products; and (4) branches of foreign companies established in Belgium.

Although it is considered that these various groups obviously cannot amalgamate, sales agreements can and do exist among them, and a uniform economic policy is possible as both the chemical and metallurgical groups are controlled by the leading banks.

Acid Production

The following figures concerning the present status of some of the principal products of the Belgian chemical industry may be of interest:—

Sulphuric acid:—Belgium now has twenty-four works producing ordinary sulphuric acid, the present annual output of acid at 60° being 700,000 tons, the greater part of which is controlled by a "comptoir." This quantity is in excess of home requirements and the surplus is exported, chiefly to Holland, which took about 140,000 tons in 1929, out of a total of 228,000 tons sold abroad. Five works manufacture concentrated sulphuric acid, the annual output of which may be estimated at 30,000 tons. It is anticipated that the production of sulphuric acid will be further developed in Belgium, owing to the increased output of synthetic sulphate of ammonia, in the manufacture of which it is now largely used.

Nitric acid:—Seventeen works are employed in producing nitric acid, the output being about 13,000 tons to 15,000 tons per annum. This is not sufficient for the requirements of the home market, and 5,700 tons were imported in 1929, chiefly from Germany. Chilean saltpetre forms the raw material for this acid, 142,000 tons being imported in 1929. A large proportion of this quantity is used as a fertiliser. The synthetic production of nitric acid has been commenced, and it is expected it will be further developed.

Muriatic acid:—The annual output of muriatic acid amounts to 100,000 tons, which is in excess of home requirements, 18,400 tons being exported in 1929, mainly to Holland (10,000 tons). This shows a large increase over exports in 1928, which amounted to 7,700 tons, of which 5,700 went to Holland. Muriatic acid is used chiefly in gelatine factories, of which there are five in Belgium, producing 7,500 tons of gelatine annually, made principally from bones imported from British India. The greater part of this output is exported, chiefly to the United Kingdom, which took about 3,000 tons of the total quantity of bone glue (5,600 tons) and 500 tons of the 610 tons of sheet and powdered gelatine exported in 1929.

Sulphate of Soda:—The output of sulphate of soda amounts to 100,000 tons, used chiefly in glass factories. Another 50,000 tons was imported in 1929, the largest quantity (44,000 tons) coming from Germany. The United Kingdom supplied 5,500 tons.

Other Chemicals:—Carbonate of soda is produced solely by the Solvay process. The output, owing to the fact that

Belgium does not possess the raw material required, amounts to only 30,000 tons, which insufficient quantity was supplemented in 1929 by the import of 116,000 tons, mainly from France (114,000 tons), a large increase over 1928, when the total imports amounted to only 69,000 tons.

The annual output of chloride of lime and of caustic soda may be estimated at about 20,000 tons of each. One of the factories manufacturing these articles uses the electrolytic process. It is estimated that the manufacture of synthetic ammonia will be developed to the extent of producing 500,000 to 750,000 tons annually.

The export trade in sulphate of ammonia is increasing rapidly, as will be seen from the fact that 51,000 tons were exported in 1929—chiefly to Spain (27,000 tons) and Portugal (4,000 tons)—as compared with a total of only 16,000 tons in 1928 and a little over 6,000 tons in 1927.

The manufacture of pharmaceutical products has greatly increased in Belgium since the armistice, in spite of keen foreign competition and heavy taxation. Photographic products are also being produced in increasing quantities.

The outlook for the future of the Belgian chemical industry appears very favourable, but, according to a competent authority, much will depend on the market for sulphate of ammonia, as excess production of this commodity might have an unfavourable influence on the entire chemical market.

The British Salesman Abroad

Need for Knowledge of Foreign Languages

THE importance of British commercial people, particularly salesmen, having an adequate acquaintance with foreign languages, is strongly stressed in the second interim report just published, of the Committee on Education for Salesmanship (H.M. Stationery Office, 6d. net). The Committee was appointed "to consider the problem of education for salesmanship, and to make any recommendations for action that, following such consideration, may appear desirable for the promotion by means of education of greater efficiency in the marketing of British goods and services, at home and overseas."

In their first interim report, extracts from which appeared in THE CHEMICAL AGE last March, the Committee pointed out that the future prosperity of British trade depended, to some extent, upon the correction of our deficiency in acquaintance with foreign languages. Lord Eustace Percy acceded to a request that an enquiry should be undertaken by the Board of Education into the teaching of foreign languages at home and abroad, and the result of this enquiry is embodied in the Committee's second report.

The present report is issued because the Committee think the facts should immediately be brought to the notice of educational, commercial and industrial interests.

A Fatal Handicap

"In almost all markets," the report states "it is a damaging, and often a fatal, handicap if representatives, whether principals or subordinates, cannot converse freely with the customer in his own language as well as read his newspapers and trade journals; and perhaps an equal handicap if correspondence from headquarters is not conducted in that language. Our export trade, however, is often so handicapped, and to-day it cannot afford to accept even small handicaps which can be avoided. This one is far from being small, and can, we are convinced, be avoided.

"There is a large and impressive body of evidence which insists on the importance of the knowledge of languages, particularly the spoken languages, from the commercial point of view. Further, among the witnesses expressing this opinion, a substantial proportion are anxious that all existing facilities, not merely those provided in the schools, should be investigated in order that any deficiencies in our national equipment may be made good. This evidence is in fact a striking confirmation of the soundness of the views which we received from overseas sources. A knowledge of languages is, of course, only one among many factors in the problem of marketing, but it has a very practical and vital bearing on the organisation of overseas trade. The whole question is obviously one for early consideration and speedy action."

Reviewing the Board of Education's report on the teaching of foreign languages abroad, the Committee points out that it "reveals the extensive provision of modern language instruction in the countries visited"—Denmark, Holland, Sweden and Germany.

"The emphasis laid on the spoken language is reflected in the inclusion of oral tests in the examinations, and the insistence on satisfactory performance in those tests. We attach great importance to this point. Another feature of interest is the appearance in several cases of business men as assessors in the examination. This is at once a guarantee against any unduly academic methods of examination and evidence that such methods are not desired by the educational authorities.

"There is no doubt that in these countries, far more interest is taken in the subject of modern languages and far more importance attached to their possession than is the case here.

"We believe that the main cause of the higher status of modern languages in the countries visited is to be found in the keen appreciation of their intrinsic importance. It is very evident that the progressive business man regards the matter as one of immediate concern from the point of view of his own trade and of that of the country as a whole."

Trade Publications

Air Tempering Ovens

A NEW catalogue has been issued by Wild-Barfield Electric Furnaces, Ltd., Elecfurn Works, Holloway, London, describing their air tempering ovens with forced air circulation. The high efficiency of nearly 90 per cent., shown in the table giving particulars of one oven, is obtained by means of the special form of fan incorporated. When this is used the rate of heating of a charge is increased by thirteen times the normal at 100° C., and by four and a half times the normal at 250° C., so that a smaller oven fitted with the fan will perform the work of a larger oven without fan. The ovens are made in numerous sizes, and an inquiry form in duplicate is attached to each catalogue.

Oil Impregnated Bushings

A new type of bush, non-metallic and oil impregnated so that no further lubrication is required throughout its life, is being placed on the market by Crofts (Engineers), Ltd., Thornbury, Bradford, and is described in their leaflet No. 309. It is claimed that they are particularly suitable for loose pulley applications of all types, they will carry loads up to 100 lb. per sq. in. at temperatures up to 100° F., and they have an exceptionally long life.

Temperature Regulators

The Drayton Regulator and Instrument Co., Ltd., West Drayton, Middlesex, have issued a revised catalogue list describing and illustrating the Drayton M.S. "Simplex" temperature regulator for controlling dye vats, water heaters, fractionating columns and similar applications. Both the air and water operated control boxes are supplied, although, it is pointed out, operation by air gives a considerably higher degree of sensitivity.

Cochran and Co. (Annan), Ltd., Annan, Scotland, the makers of Cochran boilers, have just issued their 1930–31 wall calendar.

Morris Conveyors and their multifarious applications in factories and elsewhere are dealt with in Book 449, issued by Herbert Morris, Ltd., Loughborough.

A booklet on "Development" and the uses of "Tabloid" photographic chemicals has been published by Burroughs, Wellcome and Co., Snow Hill Buildings, London.

Baillière, Tindall and Cox, 7 and 8, Henrietta Street, Covent Garden, London, have recently published a new 80-page catalogue of their medical and scientific publications.

Articles on coal conveying plant for large electric power stations and steam piston pumps are among those in the current issue of the *Demag News*, of the Demag A.-G., Duisberg.

Recent publications by Crompton Parkinson, Ltd., Guiseley, Leeds, include booklets on Transformers, "T.A.P." Circuit Breakers, the "Alltest" Instrument for D.C. tests, and Marine Electrical equipment.

An illustrated list, containing photographs of the wide range of chemical plant, rotary furnaces, grinding and mixing

machinery, drying stoves and mills, has been produced by Pratchitt Brothers, Ltd., Denton Ironworks, Carlisle.

High Grade Lubricating Greases, Their Uses and Application, has just been issued by the Vacuum Oil Co., Ltd., Caxton House, Westminster. Besides general notes on grease lubrication, the brochure gives particulars of the various grades of Gargoyle greases and their application in different industries.

The Drayton Regulator and Instrument Co., Ltd., West Drayton, Middlesex, has just issued leaflets on Indicating and Recording Liquid Level Gauges, Air Compressor Sets, Float Operated Electric Switches, Heavy Duty Industrial Steam Traps, Differential Steam Traps and the "Union" Portable Gas Calorimeter.

New lists recently published by Gallenkamp and Co., Ltd., 19, Sun Street, Finsbury Square, London, include List 75G, dealing with their small electric furnaces for laboratories and works, List 231F on electrically heated apparatus and an addenda list to the General and Industrial Laboratory Apparatus Catalogue, eighth edition.

A pamphlet dealing in a general manner with the merits of tar for road making has been issued by the British Road Tar Association, 17, Grosvenor Gardens, London, S.W., for the benefit of all those interested in the production, marketing, or use of tar, and as an invitation for them to ask for information bearing on individual requirements.

A leaflet on Glutathione now produced on a commercial scale in the B.D.H. laboratories accompanies the new catalogue of B.D.H. fire chemical products for laboratory use, including organic and inorganic chemicals, analytical reagents, standard stains and indicators, published by the British Drug Houses, Ltd., Graham Street, London, N.

A special publication by Metropolitan-Vickers Electrical Co., Ltd., describes their Self-Contained Turbo Generator Sets which they originated and developed in 1927. Nearly 100 orders have now been received from all parts of the world for these sets, which have notable advantages of compactness, high fuel economy, and ease of installation and operation.

The Sihi Self Priming Pump Co., Standish Road, Fallowfield, Manchester, has issued a leaflet on its Centrifugal Vacuum Pump, which is particularly suited for vacuum production in chemical process work. Entrained liquid, it is stated, cannot cause any damage with this pump, and, if necessary, the auxiliary fluid can be such that the exhausted gases are neutralised in their passage through the pump.

Beit Fellowship Awards

THE Trustees of the Beit Fellowships for Scientific Research have awarded Fellowships, tenable at the Imperial College of Science and Technology, South Kensington, for the two years 1930–32, and of the value of £250 a year, to the following:

Mr. Bernard William Bradford, A.R.C.S., B.Sc., D.I.C., free student of the Board of Education, Frankland Medallist, Institute of Chemistry and Imperial College Prizeman in Chemistry, formerly of the Gravesend Secondary School, and of the Imperial College; for research upon the electrical condition of hot metallic surfaces when promoting the combustion of carbonic oxide.

Mr. George Maxwell Richardson, B.Sc. (N.Z.), M.Sc. (N.Z.), Ph.D. (London), educated in New Zealand, Senior Scholar in Chemistry of the New Zealand University, 1851 Exhibition (Overseas) Research Scholar; for research into the further application of electrometric methods and theory to the study of problems of biological interest.

Mr. Geoffrey Herbert Cheesman, A.R.C.S., B.Sc., educated at King's College School, Wimbledon, and the Imperial College; for research on the electron distribution and structure of the halogen oxides.

German Theobromine Production

WHILE there are no official statistics available indicating Germany's production of theobromine, it is estimated that the production of this alkaloid is approximately 3,000 kilos (1 kilo equals 2·2 lb.) per year, of which approximately 1,000 kilos are exported. Germany's foreign trade statistics do not show exports of theobromine separately.

A National Economy Manifesto

To the Editor of THE CHEMICAL AGE.

SIR,—Political discussion in recent years has tended to ignore much of the best thought of the nation. Large sections of serious citizens are excluded from and forgotten by the parties as at present constituted. It is perhaps natural that party managers should ask themselves: "What will the people stand?" rather than "What is good for the people?", but the safety of the nation depends upon the striking of a proper balance between these two questions.

No present party takes any serious interest in economy; all appear to accept as inevitable a continuance of public expenditure on something like the present scale. Thus the root cause of our economic troubles is to remain, and our position in the world, economically and socially, must sink ever lower. The stupidity of bribing the people with their own money is beginning to be realised by the people themselves, and retrenchment is a battle cry to which we believe the genius of the nation would be proud to rally.

Economy is much more than a matter of mere money. A large share of the product of industry is taken and spent merely to hamper industry. The spirit of extravagance is fostered and fictitious "rights" take the place of natural responsibilities. Hundreds of Acts of Parliament attempt at great expense to stop an occasional thief by the degrading and ineffectual process of holding up all the honest men, and extravagance is promoted by the modern and un-English mania for the management of the affairs of others.

Unless we reverse the present policy of controlling all the actions of everybody, public expenditure will increase indefinitely and national productivity will further decline. The happiness of a people is only to be secured by the limitation to the minimum of the powers and processes of government, and not, as is apparently the aim of all political parties, by their continual expansion.

The position of Free Trade is more complicated. The large number of Conservative Free Traders is entirely overlooked in present party arrangements. Liberal Free Traders can only follow their cause if they agree to mix it up with such variations of Collectivism as may be produced from time to time by the party headquarters.

Such is the curious condition of present-day politics that Free Trade may have to look for its chief standard-bearer to a party which, while professing to believe in freedom for the foreigner, denies any vestige of it to the trader or worker at home. Free Traders, however, can appeal for the support of those who, while doubting the theories of Cobden, still fear for the safety of the nation. There is to-day a greater danger in Protection than the mere violation of a theory. British industry, protected or unprotected, cannot survive a continuance of the present burden of taxation. Nor can it continue to function with all the inspection and restriction, official and unofficial, which now encumber it. Protection, even to the point of the prohibition of imports, cannot save it while these major troubles remain, and protectionist propaganda at this moment only serves to divert attention from them.

The political instinct of the British people is worthy of something better than is now offered by the organised parties. Our national politics stand in urgent need of new inspiration. It must be remembered that the ruling generation has no personal experience of our old liberties, and is thus perforce without most of the incentive to enterprise on which this country has hitherto always relied.

The nation is ready to move to a higher political level and occupy itself with the principles of Government. Cannot one of our parties found its aims and actions on the simple proposition: "That the control of economic forces by political means violates every principle on which British prosperity was founded, is alien to the free instincts of the national character, and ought only to be used, if at all, within the narrowest limits?"—Yours, etc.,

HENRY BELL, HUGH BELL, ERNEST J. P. BENN, COWDRAY, F. D'ARCY COOPER, HAROLD COX, CHARLES HARRIS, LEVERHULME, CHARLES MALLET, THOMAS E. PAGE, ALEXANDER ROGER.

The Distillers' Company

Solvents Market "Unduly Depressed"

AT the annual meeting of the Distillers' Company, Ltd., held at Edinburgh on Thursday, July 17, Mr. William H. Ross, the chairman, said that the leading feature of the directors' policy for the past fifty years had been rationalisation, which meant amalgamation, centralisation, co-operation, or the effecting of economies in any other way. Their success had been proved by the fact that in only one year had the dividend fallen below 10 per cent.

The expansion in the use of industrial spirits had been a satisfactory feature in the past year, although the advantages had been more than neutralised by unsatisfactory sale prices. Fortunately, a change had been brought about in the ownership of one of their chief competitors, and an improved position was likely to materialise in this market.

The yeast trade had also suffered from intensive competition during the past twelve months, chiefly through cheap quotations from Germany, where the exporters received what was virtually an indirect bounty on their manufacture. Events pointed to an improvement in this position at an early date.

The interests acquired in the new solvent business were not yet fully developed. The products so far produced had proved most satisfactory in quality, but they had arrived on a market which was unduly depressed, for which various causes were assigned. Whenever an improvement took place the British Industrial Solvents, Ltd., were in a position to supply the market with the very best of products. Meantime their policy must continue to be guided by the slogan, "Rationalise, Organise, Advertise."

In addition to the controlling interest in the Corio Distillery, in Victoria, Australia, the company had just acquired on favourable terms a very large interest in the only other Australian producer of whisky. This was rendered necessary by the repeated increase of the Australian Preference on locally-made spirits. The company now had an interest in the whole production of Australian spirits.

Factory Effluents and River Pollution

Water Supply of Dyeing and Bleaching Works

A COMMITTEE of the Federation of British Industries has had under consideration the second report of the Advisory Committee on Rivers Pollution, urging that industrial effluents should be taken into local authorities' sewers under agreed arrangements and suitable safeguards.

The Federation's Committee unanimously approved the principle but at the same time agreed to emphasise to the Minister of Health that every precaution must be taken in such schemes that water rights should be most rigorously safeguarded. In industrial law, supplies of water to big industrial consumers, such as the dyeing and bleaching industries, etc., are mostly taken from streams to which they are eventually returned after use and treatment. During periods of drought the supply of water in these streams is under present conditions often insufficient for the use of all the factories and mills, and therefore any depletion which would be bound to arise if effluents went into the public sewers would mean the closing down of works.

The Committee also realised that while admitting that a local authority should certainly be able to protect itself against the admission of effluents which might damage either the sewers or the sewage works, it was highly desirable that there should be full provision in all those agreements for arbitration on such practical issues as to the nature, preliminary treatment, etc., so that the manufacturer would be assured of a proper consideration of his problem and an impartial decision in those cases where difficulties might arise between the local authority and the manufacturer.

Soap and Candle Makers' Directory

THE 1930 edition of *The Soap Maker's Directory* has just been issued by Simpkin Marshall, Ltd., Stationers' Hall Court, London, price 2s. 6d. An alphabetical list of soap makers in London, is followed by similar lists for the provinces, Scotland and Ireland giving telephone and telegraphic addresses and details of railway facilities. The book is also a directory of candle makers in Great Britain and both the soap and candle sections are preceded by a classified index of sorts and the principal makers.

Chemical Matters in Parliament

Fuel Research Board Grants

THE Secretary for Mines (Mr. Shinwell) announced in the House of Commons on July 18, that the amounts expended from the votes of the Department of Scientific and Industrial Research for work supervised by the Fuel Research Board during the financial years 1928–29 and 1929–30 were £77,877 and £84,706 respectively. The estimate for the current financial year is £86,803.

In reply to a further question on July 21, Mr. Shinwell stated that the average net annual expenditure of the Department on fuel research during the last five years was £83,000. Most of the investigations carried out were of more or less direct interest to those engaged in producing oil from coal. It was impossible to separate the costs of the various items on the programme, but large sums had been spent on research and experiments dealing with the low temperature carbonisation of coal, and in testing commercial plants. In addition, the Government had guaranteed the principal and interest on a loan of £100,000 for an experiment on a low temperature carbonisation process on a commercial scale at Richmond by a subsidiary of the Gas Light and Coke Co. As regards hydrogenation, the technical possibility of converting coal to oil by the Bergius process had been proved, and, partly as a result of financial assistance rendered by the Department of Scientific and Industrial Research, the results of much of the work done by Dr. Bergius had been made available to this country. Work was continuing at the fuel research station, and a small grant was also being made to the British Colliery Owners' Research Association to meet half the cost of a programme of research which the association was undertaking. Grants amounting to £7,500 had in the past been made to the Scottish Shale Oil Scientific and Industrial Research Association.

The Dyestuffs Act

Mr. Mander (House of Commons; July 22) asked the President of the Board of Trade if he would state what communications he had received with reference to the position which would arise when the Dyestuffs (Import Regulation) Act expired in January next, and whether any representations made were favourable to continuance or otherwise.

Mr. W. Graham: The Dyestuffs Industry Development Committee, appointed under Section 2 (6) of the Dyestuffs (Import Regulation) Act, 1920, to advise on the development of the dye-making industry, have recently presented a report which will be published shortly.

Mr. Mander: Is the President of the Board of Trade aware that any attempt to extend this Act will be strenuously opposed from these Benches?

Mr. Graham: Representations in both senses have reached me, but a very comprehensive report will be available to hon. Members almost immediately.

Sir P. Cunliffe-Lister: In spite of that dreadful threat, will the President of the Board of Trade take into account the speech recently made by the President of the Colour Users' Association?

Mr. Graham replied that all relevant considerations would be borne in mind.

Finance Bill Clauses

During the consideration of the Finance Bill in the House of Commons on July 17 a new clause was moved by Sir H. Buckingham urging that for purposes of income tax earned income relief should be given in respect of royalties received by inventors. Mr. Pethick-Lawrence (Financial Secretary to the Treasury) said that when an inventor sold his inventions outright the sale was treated as a sale of capital, and the inventor escaped income tax. If the practice were changed it would be necessary to treat as income any sale outright of a patent. The clause was withdrawn.

A further clause was moved by Mr. Churchill to provide relief from taxation on money expended on the purchase, installation, erection, or improvement of plant or machinery with a view to the re-equipment, modernisation, or improvement of such plant or machinery.

Mr. Snowden said if the clause were adopted the largest recipients of public bounty would be those who least needed it. It would not provide a way in which money could best be spent to the public advantage.

The clause was defeated.

From Week to Week

FOR THEIR ANNUAL OUTING some 400 employees of Sandilands Chemical Works, Aberdeen, travelled to the Lynn Park, Milltimber.

A VERDICT that death was due to the effects of barium sulphide, supplied in error for barium sulphate, was returned at an inquest at Haydon Bridge, Northumberland, on Friday, July 18, on Jacob Allen Brown of New Alston.

THE CONSTRUCTION of the superphosphate plant now being erected for the Dominion Fertiliser Co., Ltd., of Dunedin, New Zealand, at a cost of £226,000, will be completed about the end of this year, and its annual capacity will be 50,000 tons.

AN IODINE FACTORY, the first established under the Irish Free State Government's scheme for the purchase and utilisation of kelp, will shortly be in full working order in Galway and will be able to deal with any quantity of kelp obtainable on the Western seaboard area.

AN EXTRAORDINARY general meeting of British Tintex and Dye Products, Ltd., was held in London on Thursday, July 17, when a resolution was carried for the auditors and Mr. Henry Morgan, president of the Incorporated Accountants' Society, to investigate the company's affairs and submit a report on the texact position.

FATAL ACCIDENTS in the chemical industries during June numbered 2 out of a total of 136 for all the industries of Great Britain and Northern Ireland. The fifteen cases of chrome ulceration reported during the month came from the following industries: Manufacture of bichromates 2, dyeing and finishing 2, chrome tanning 1, chrome plating 10.

WORKS EXTENSIONS are shortly to be made at the Chemical and Insulating Co., Darlington, which were constructed only two years ago for the production of magnesia and insulating materials. Manufacture is now being carried on day and night and when the extensions are completed it will be possible to add 100 more workpeople to the 190 at present employed.

THE NUMBER OF UNEMPLOYED in the chemical industry of Great Britain and Northern Ireland on June 23 was 12,187 or 11·5 per cent. out of a total of 105,890 insured workpeople. This is an increase of 0·8 per cent. during the month and 5·4 per cent. compared with the figures of June, 1929. The percentage of workers unemployed in the explosives industry on June 23 last was 8·8, in the paint and varnish industry 6·0, and in the oil, glue, soap, ink and match industries 10·1.

SEVERAL THOUSAND TONS of hot liquid asphalt, the residue of a night-and-day process of distilling oil, have recently been exported from Fawley, near Southampton, to Germany and Italy by the Anglo-American Oil Co. The asphalt is pumped at the rate of 150 tons an hour through steam-heated insulated pipes to the end of a jetty where a specially constructed ship with steam-heated tanks receives it and keeps it in its hot liquid state throughout the voyage until ready for delivery on the Continent.

AT A MEETING of the shareholders of the Nuera Art Silk Co. held at St. Helens, Lancs., on Friday, July 18, Sir James Paton, the chairman, said that negotiations were now pending for raising fresh capital with a view to continuing the business and perfecting the processes, but they had not been able to stave off the present position. A resolution, proposed by the chairman, for winding up the company voluntarily and nominating Mr. H. W. Garnet, of Manchester, as liquidator, was carried with three dissentients. The chairman said that the liquidation would not prevent the negotiations being continued.

UNIVERSITY NEWS.—*London:* The following doctorates have been conferred: D.Sc. in Biochemistry, Mr. R. K. Cannan, internal student of University College and East London College, and Mr. S. A. Mann, internal student of East London College; D.Sc. in Chemistry, Mr. M. A. N. Rao, internal student of the Imperial College, Royal College of Science. *Leeds:* Mr. G. H. Giles has been appointed as Research Assistant in Dyeing and Mr. A. C. Roberts as Research Assistant in Refractory Materials. *Durham:* Mr. Robert Spence has been recommended for the degree of Ph.D. for theses on the Production and Constitution of some Polynuclear Compounds derived from Naphthalene, and on the Kinetics of Hydrocarbon Oxidation.

THE BILL creating the national combine of Chilean nitrate companies was signed on Monday by President Ibanez.

MR. W. SEAMANS JACK, formerly a Newmilns chemist, has been appointed manager of the Canadian branch of British Drug Houses, Ltd.

GERMAN POTASH SYNDICATE sales in the first half of this year amounted to 829,251 tons, compared with 829,906 tons in the corresponding period of 1929.

THE BRITISH WOOD PRESERVING ASSOCIATION held its first general meeting at 166, Piccadilly, London, on Thursday, July 17, when Sir Harold Boulton was elected president, Lord Clinton and Sir James Calder vice-presidents, and Sir Peter Clutterbuck hon. treasurer.

MR. W. V. BLEWETT, of Imperial Chemical Industries (Australia), Ltd., Melbourne, has assumed control of field work and propaganda on behalf of Nitrogen Fertilisers Pty. Ltd., which has taken over the work of the Australian Sulphate of Ammonia Propaganda Committee.

A NEW DEPOT at Mervyn House, Frederick Street, Cardiff, has been opened by Metropolitan-Vickers Electrical Co., Ltd., for the sale of their "Cosmos" lamps in the Cardiff district. Sales in the Swansea area will be conducted from the company's existing offices at 62, Wind Street, Swansea.

ANGLO-NORSE CO., LTD., which is controlled by Anglo-Norwegian Holdings, Ltd., the largest British unit in the whaling industry, announces a dividend of 50 per cent. for the year ended June 30, 1930, the same as for the preceding year. The company's production of whale oil for the current year was 83,000 barrels, as compared with 61,000 barrels in 1929.

ALEXANDER GORDON, a commercial traveller, employed by Regent Chemicals, Ltd., Craigleith, Edinburgh, was sent to prison for 30 days at Aberdeen Sheriff Court on Saturday for having embezzled £1 6s. 6d. belonging to the firm. Accused pleaded guilty, but said that the firm owed him some money and he thought it would be all right to deduct it from the accounts he had collected.

EXPORTS OF DRUGS from Great Britain during 1929, according to the annual Government report to the League of Nations, just issued, show a decrease of 7,492 ounces of morphine and 1,215 fewer ounces of heroin than in 1928. 9,326 ounces of cocaine were manufactured and 4,329 ounces imported. No seizures of importance of illicit drugs occurred in this country, but seizures in the Dominions show that there is little if any diminution in the traffic.

DISTILLATION and oil refining plant at Newnes, in Wolgan Valley, New South Wales, which has been idle since 1923, has been purchased by North Broken Hill, Ltd., Broken Hill South, Ltd., the Zinc Corporation, Ltd., and Electrolytic Zinc Co. of Australasia, Ltd., and an option is being taken over leases of some 10,000 acres of oil shale lands in the neighbourhood of the plant. A thorough investigation is to be made of the possibilities of producing commercially fuel and lubricating oil from the shale.

THE BOARD OF TRADE have referred to the Standing Committee appointed under the Merchandise Marks Act, 1926, an application for an Order in Council to require air and gas compressors and exhausters and pneumatic tools and appliances, to bear an indication of origin. Representatives of any interests substantially affected by the application who desire to be heard in opposition at the public inquiry, which will be held by the Committee, should communicate with the Secretary, Mr. E. W. Reardon, at the Board of Trade Offices, Great George Street, London, not later than August 31.

DETAILS of the new national organisation which is to be set up to combat disease in workmen caused by exposure to silica or asbestos dust were given, during the discussion on the Workmen's Compensation (Silicosis) Bill, by Mr. Short (Under-Secretary of the Home Office) in the House of Commons recently. It was stated by Mr. Short that a Treasury grant of about £1,000 would be available for the general purposes of the organisation, which would also be financed by fees from employers in respect of periodical examinations, and from workmen on application for certificates that they were suffering from disease. The total expenditure was estimated at between £13,000 and £15,000 annually.

Obituary

MR. DAVID ROBERT EVANS, manager of the Arran Patent Fuel Co., Newport, Mon., in his 61st year.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

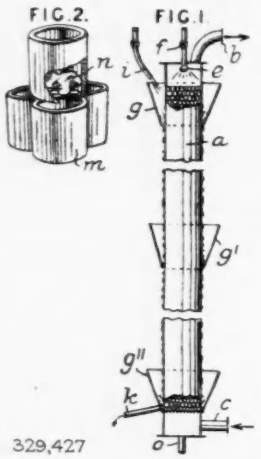
Abstracts of Accepted Specifications

329,396. DIOLEFINES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 22, 1929.

1 : 3-Butylene glycols and water vapour are treated with a catalyst consisting of an oxide of a metal or non-metal having a dehydrating action, or a borate of such metal. Compounds yielding the oxides may be used. Activating additions may be made, *e.g.*, copper sulphate or red phosphorus. In an example, the catalyst is prepared by impregnating pumice with thorium nitrate and heating, and butadiene is obtained by passing butylene glycol over it at 300° C.

329,427. NITRIC ACID. Hercules Powder Co., 900, Market Street, Wilmington, Del., U.S.A. (Assignees of J. H. Shapleigh, Mountain Lakes, N.J., U.S.A.) International Convention date, January 28, 1929.

Oxides of nitrogen enter a packed tower *a* at *c* and pass upward in counter-current to water introduced by a sprayer *e*



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Highly concentrated nitric acid is drawn off at *o* and the spent gases at *b*. Cooling water is supplied by pipe *i* to a funnel *g* and passes over the surface of the tower to funnel g^1, and thence to funnel g^2 and outlet *k*. The packing consists of glass cylinders *m* containing acid-resisting material *n*.

329,456. VULCANIZING. Imperial Chemical Industries, Ltd., Millbank, London, S. Coffey, W. J. S. Naunton, and A. Shepherdson, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, April 4, 1929.

A vulcanization accelerator consists of an N : N-dithio derivative of a secondary amine, such as N : N-dithio-piperidine (Berichte der Deutsch Chem. Gesell. 28 (1895), p. 165 et seq.)

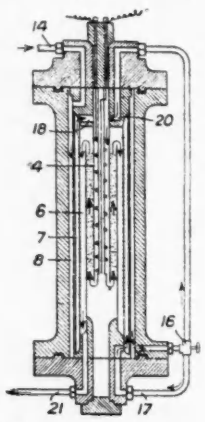
329,495. DOUBLE PHOSPHATES. Kali-Forschungs-Anstalt Ges., 5, Schönebergerstrasse, Berlin. International Convention date, December 6, 1928.

Commercial phosphoric acid or phosphate solutions are treated with an excess of the final or waste liquors obtained in the potassium industry. The phosphoric acid is then neutralised with excess of ammonia, and a crystalline precipitate is obtained which is washed and dried at 100° C. until most of the water of crystallisation is evaporated. Magnesium-ammonium-phosphate is obtained, and may be added to non-distributable fertilisers. Thus, when added to ammonium nitrate, the mixture remains unaltered and distributable after four weeks.

329,551. CATALYTIC APPARATUS. Union Chimique Belge, Soc. Anon., 61, Avenue Louise, Brussels. International Convention date, November 13, 1928.

In an exothermic gaseous reaction the incoming gases pass between the outer pressure tube and the heat exchanger and are then divided, one part passing through the heat exchanger, after which it is mixed with the other portion and passed through the catalyst.

The gases entering at 14 pass through the heat insulated



329,551

space 8, and are divided by the valve 16 so that one part passes through pipe 17, to heat exchanger 7. The other part of the gas passes through an external pipe to the top of the apparatus and is then mixed with the heated portion and passed to the catalyst chamber 4. The gas finally passes through heat exchanger 6 to the outlet 21.

329,622. WETTING AGENTS. R. Sajitz and E. Thiel (Geb. Sajitz), 39, Priessnitzerstrasse, Dresden, Germany. International Convention date, November 28, 1928.

The polymerisation products of lower hydrocarbons are sulphonated by means of monohydrate, oleum or chlor-sulphonic acid in the presence of the anhydrides or chlorides of the lower fatty acids—*e.g.*, acetic or lactic anhydride, or acetyl or propionyl chloride. The polymerisation products may be obtained by condensation of alcohols having 3 or more carbon atoms, preferably secondary or tertiary alcohols, by means of sulphuric acid, zinc or aluminium chloride. In an example, tertiary butyl alcohol is mixed with sulphuric acid while cooling and then heated, and the upper oily layer is sulphonated with chlor-sulphonic acid in the presence of carbon tetrachloride or with mono-hydrate in the presence of acetic anhydride. The products are wetting, frothing, washing, cleansing, emulsifying and dispersing agents, and may be used for pasting dyestuffs, splitting fats and sulphonating oils and fats. Various hydrocarbon products obtained from petroleum are also used.

329,641. FERTILISERS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 16, 1929.

Mixtures of fertilising salts are obtained by double decomposition of salts of strong mineral acids in liquid ammonia, or by treating salt mixtures with gaseous ammonia. Other fertilisers, or salts which absorb ammonia, such as ammonium nitrate or alkaline earth chlorides, may be added. In an example, a mixture of sodium chloride, ammonium nitrate and liquid ammonia is heated to 100° C. in a closed vessel and then evaporated to obtain a mixture of sodium nitrate, ammonium nitrate and ammonium chloride. A similar treatment of potassium chloride at 0° C. yields a solid residue of potassium nitrate and solution of ammonium chloride, and a similar treatment of dipotassium phosphate yields a mixture of di-ammonium phosphate and potassium nitrate. If mono- or di-potassium phosphate and ammonium nitrate are treated with gaseous ammonia, a mixture of ammonium nitrate and potassium phosphate is obtained. Gypsum may be treated with a solution of ammonium nitrate in ammonia to obtain

solid ammonium sulphate, and a solution of calcium nitrate which may be evaporated or converted into calcium carbamate.

329,672. DISINFECTANTS AND ORGANIC MERCURY COMPOUNDS. Sir G. C. Marks, London. From E.I. du Pont de Nemours and Co., Wilmington, Del., U.S.A. Application date, January 19, 1929.

A mercury salt is treated with an alkyl, aryl or aralkyl derivative of a metal above mercury in the electro-chemical series. A liquid medium is not used, but a solid inert diluent may be present, and the resulting mercury compound is obtained in the form of dust. Products are described which are obtained from tetra-ethyl lead, mercuric acetate and kaolin; tetra-ethyl lead, mercuric chloride and sodium sulphate; tetra-methyl lead, mercuric chloride and infusorial earth; triethyl lead chloride, mercuric chloride and clay; tetraphenyl lead, mercuric acetate and infusorial earth; tetra-ethyl tin, mercuric chloride and calcium sulphate; bismuth triethyl, mercuric chloride and kaolin; tetrabenzyl tin, mercuric acetate and clay. The products in dust form may be used as disinfectants, *e.g.*, for dusting seeds or may be suspended in water, and may be used for wet treatment.

329,688. DESTRUCTIVE HYDROGENATION. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 17, 1929.

Gases from destructive hydrogenation are freed from condensible products and while still under pressure are purified from hydrogen sulphide by treatment with suitable reagents for such a time that the gas contains less than 0·3 per cent. of hydrogen sulphide by volume, and may be returned to the reaction. Substances for removing hydrogen sulphide include water, oils, cyclohexane, hydrogenated naphthalene, pentanol, butanol, carbon tetrachloride, chloroform, benzene, chlorobenzene, destructive hydrogenation oil fractions boiling between 180°-350° C., alkalies, ammonia and ferric hydroxide. Several absorption agents may be used in series—*e.g.*, silica gel having large pores and a high rate of absorption, followed by silica gel having small pores and a slower rate of absorption.

329,716. DYES. Imperial Chemical Industries, Ltd., Millbank, London, and M. Wyler, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, February 26, 1929.

Aceto-*p*-xylidide is nitrated in sulphuric acid at 0°-5° C. and is converted into the amino compound by reduction in acid solution. Either nitro- or amino-aceto-*p*-xylidide is heated with sulphur in the presence of two or more molecular proportions of benzidene to obtain dyes giving orange shades on cotton in a sulphide bath.

329,721. ACYL HALIDES. G. B. Ellis, London. From Soc. des Usines Chimiques Rhône-Poulenc, 21, Rue Jean-Goujon, Paris. Application date, March 1, 1929.

Acyl halides are obtained by heating in the liquid phase α-halogen or α-β-dihalogen-ethyl esters with acid catalysts, such as inorganic acids, organic acids containing an inorganic radical such as aliphatic and aromatic sulphonic acids, acid salts such as bisulphates, and acid-reacting salts such as zinc and cadmium halides. The α-halogen-ethyl esters and the α-β-dihalogen-ethyl esters may be obtained by the action of halogen acid or halogen respectively on the corresponding organic vinyl ester. In an example, α-monochlorethyl acetate is heated with zinc chloride or bromide, or sulphuric or phosphoric acid. Acetaldehyde, acetyl chloride and paraldehyde are successively distilled off. In another example, α-chlorethyl-chloracetate is similarly treated to obtain acetaldehyde, chloracetyl chloride and paraldehyde. Other examples include the treatment of α-chlorethyl butyrate, α-β-dichlorethyl acetate, α-β-dibromethyl acetate or butyrate, and α-β-dichlorethyl-chloracetate.

329,737. CARBAMATES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 11, 1929.

Solutions or suspensions of metal salts or of oxides or hydrates of alkaline earths in ethyl or methyl alcohol, glycerine, formamide, etc., are treated with ammonia and carbon dioxide to obtain carbamates. The liquid medium is one which does not take part in the reaction and in which the carbamates are substantially insoluble. Thus, calcium chloride, nitrate or hydroxide may be converted into calcium carbamate, barium oxide into barium carbamate, lead nitrate or acetate into lead carbamate, and sodium nitrate into sodium carbamate. Calcium carbamate may be heated in ammonia gas to obtain the cyanamide, sodium carbamate may be heated with water to obtain soda, or to 350° C. to obtain sodium cyanide.

329,741. DYE INTERMEDIATES. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 13, 1929.

The alkali metal salt of a 2 (4^1-hydroxyarylamino)-naphthalene in which the aryl group has the 3^1-position, and may carry one alkyl group, is treated with carbon dioxide at a raised temperature and pressure. The resulting carboxylic acids are used as dyestuffs intermediates. The starting materials are obtained by condensing 2-hydroxy-3-naphthoic acid with an aminophenol or aminocresol in which the hydroxyl is *p*-to the amino group. Examples are given of the treatment of 2- (4^1-hydroxyphenylamino) naphthalene, 2- (4^1-hydroxy-2^1-methylphenylamino) naphthalene, 2- (4^1-hydroxy-3^1-methyl-phenylamino) naphthalene.

329,748. 1 : 3-BUTADIENE. C. J. Leyes, 347, Danforth Avenue, Jersey City, N.J., U.S.A. Application date, March 20, 1929.

Vinyl halides, sulphide and oxide, preferably the bromide, are passed continuously over heated metal, which may be molten, and the products, containing 1 : 3-butadiene continuously withdrawn. Suitable metals include iron, copper, lead, tin, bismuth, antimony, cadmium, zinc, aluminium and tin alloys.

329,867. ACETALDEHYDE. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 12, 1929.

Acetylene, or gas containing it, and water vapour are passed over a catalyst heated to 300°-400° C., consisting of tungsten oxides, tungstic acid, ammonium tungstate, tungsten sulphide or carbide, silico-tungstic or phospho-tungstic acids. Activators may be added such as zinc oxide, cobalt sulphide, copper oxide, zinc selenide, phosphides, or mixtures of tungsten oxides and phosphoric or boric acid. Some examples of the preparation of suitable catalysts are given. Acetaldehyde is separated from the gaseous products, which are then used for preheating the reaction gases.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to objection under the International Convention:—304,326 and 307,704 (I.G. Farbenindustrie Akt.-Ges.), relating to manufacture of azo dyestuffs on the fibre, see Vol. XX, pp. 320 and 479; 308,220 (I.G. Farbenindustrie Akt.-Ges.), relating to manufacture of phenolic compounds, see Vol. XX, p. 507; 308,359 (I.G. Farbenindustrie Akt.-Ges.), relating to manufacture of 6-sulphonic acids of quinizarin and its homologues, see Vol. XX, p. 508; 308,599 (Bayerische Stickstoffwerke Akt.-Ges.), relating to production of phosphoric acid and hydrogen, see Vol. XX, p. 523; 308,617 (I.G. Farbenindustrie Akt.-Ges.), relating to vat dyestuffs, see Vol. XX, p. 523; 309,552 (I.G. Farbenindustrie Akt.-Ges.), relating to acid wool dyestuffs, see Vol. XX. p. 594; 309,602 (Soc. l'Air Liquide, Soc. Anon, pour l'Etude et l'Exploitation des Procédés G. Claude), relating to hydrogen peroxide, see Vol. XX, p. 595.

Specifications Accepted with Date of Application

307,079. Dissolving organic colloids. Oranienburger Chemische Fabrik Akt.-Ges. March 2, 1928.

309,033. 2-aryl-4 : 6-dihydroxypyrimidines, Manufacture of. I.G. Farbenindustrie Akt.-Ges. April 3, 1928.

309,090. Concentrated titanyl- and titanic sulphate solutions, Manufacture of. I.G. Farbenindustrie Akt.-Ges. April 4, 1928.

309,184. Salts of antimonic acid, and of organo-stibinic acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. April 7, 1928. Addition to 311,448.

309,192-3 and 309,454. Dyestuffs of the anthraquinone series and derivatives thereof, Manufacture of. I.G. Farbenindustrie Akt.-Ges. April 7, 1928, and April 10, 1928. 309,454, addition to 309,193.

309,957. Treating leucitic rocks with oxides of nitrogen, Method of. F. Jourdan. April 18, 1928.

311,759. Liquid products from coal and other carbonaceous material, Manufacture of. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. May 16, 1928.

313,612. Phospho-nitrogenous manures, Production of. Soc. d'Etudes Scientifiques et d'Entreprises Industrielles. June 15, 1928.

314,976. Phosphoric acid and products containing the same, Manufacture of. Aktiebolaget Kemiska Patenter. July 7, 1928.
316,195. Guanidine derivatives, Manufacture of. Soc. of Chemical Industry in Basle. July 24, 1928.
331,482. Diolefines directly from alcohols, Preparation of. S. V. Lebedev. January 30, 1929.
331,485-331,526. Fractionally condensing petroleum and other vapours. A. Losey, P. Gottlieb, and L. L. Haupt. October 10 and December 11, 1928.
331,525 and 331,535. Catalytic oxidation of toluene. Gas Light and Coke Co., W. G. Adam, W. V. Shannan and M. Cuckney. January 29, 1929.
331,509. Destructive hydrogenation of coal, oils, and the like. H. G. Watts and Imperial Chemical Industries, Ltd. April 2, 1929.
331,531. Cracking of hydrocarbons. J. H. Bregeat. March 27, 1929.
331,548. Destructive hydrogenation of coal, oils, and the like. C. F. R. Harrison and Imperial Chemical Industries, Ltd. April 2, 1929.
331,596. Aromatic amino-sulphochlorides, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) April 10, 1929.
331,597. β-naphthylamino-arylhydroxy fatty acids, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) April 10, 1929.
331,610. Acetylene from gaseous mixtures, Recovery of. P. H. Hull and Imperial Chemical Industries, Ltd. April 20, 1929.
331,620. Vat dyestuffs of the anthraquinone series, Manufacture of. A Carpmael (*I.G. Farbenindustrie Akt.-Ges.*) April 30, 1929.
331,637. Concentration or extraction of organic acids occurring in aqueous solution. Soc. Anon. des Distilleries des Deux-Sèvres. March 20, 1929. Addition to 312,046.
331,654. Acetylene from gases, Removal of. G. F. Horsley, F. Roffey, and Imperial Chemical Industries, Ltd. May 24, 1929.
331,674. Sulphates containing little or no water of crystallisation, Production of. O. Kazelitz and Kali-forschungs-Anstalt Ges. June 17, 1929.
331,687. Intermediates for dyestuffs, Manufacture of. Imperial Chemical Industries, Ltd., and M. Wyler. June 27, 1929.
331,697. Blue vat dyestuffs, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) July 10, 1929. Addition to 320,397.
331,728. Oxidation of ammonia. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 17, 1929.
331,734. Carbon disulphide, Production of. Imperial Chemical Industries, Ltd., W. B. Fletcher, T. S. Wheeler, and J. McAulay. August 21, 1929.
331,558. Liquid hydrocarbons and hydrocarbon derivatives Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) January 7, 1929.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Bampfylde, J. W. Catalytic treatment of organic substances. 21,688. July 17.
Binnie, D., and Imperial Chemical Industries, Ltd. Production of liquid hydrocarbons. 21,864. July 19.
Böhme Akt.-Ges., H. T. Production of solid salts of alkyl sulphuric acids. 21,778. July 18. (Germany, August 22, 1929.)
Bollmann, H. Production of phosphatides. 21,418. July 15. (Germany, October 21, 1929.)
Caro, N., and Frank, A. R. Preparation of cyanamides. 21,331. July 14. (Germany, December 18, 1929.)
Carpmael, A. and I.G. Farbenindustrie Akt.-Ges. Treatment of liquids containing albumen, etc. 21,305. July 14. (May 1, 1929.)
—— Process for immunising seed grain, etc. 21,306. July 14. (May 1, 1929.)
—— Proofing materials against fungoid infections. 21,307. July 14. (May 1, 1929.)
—— Working-up crude cellulose ester solutions. 21,527, 21,529. July 16.
—— Vulcanisation of rubber, etc. 21,528. July 16.
—— Preserving rubber, etc., masses. 21,803, 21,804. July 18.
—— Manufacture of condensation products, etc. 21,882. July 19.
Durand and Huguenin Akt.-Ges. Manufacture of dyestuffs. 21,884. July 19.
Ellis, G. B. (Merck). Manufacture of therapeutic compounds. 21,433. July 15.
—— (Soc. des Usines Chimiques Rhône-Poulenc). Quinoline derivatives. 21,683. July 17.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Treating soya bean oil, etc. 21,288. July 14.
—— Heat-transferers. 21,289. July 14.
—— Manufacture of amines, etc. 21,420. July 15.
—— Apparatus for coal dust firing. 21,538. July 16.
—— Treatment of solid substances under pressure. 21,867. July 19.
I.G. Farbenindustrie Akt.-Ges., and Groves, W. W. Manufacture of compounds containing nitrogen. 21,818. July 18.
I.G. Farbenindustrie Akt.-Ges. Production of anti-corrosive coatings on iron, etc. 21,302. July 14. (Germany, July 15, 1929.)
—— Production of bleaching-powder. 21,393. July 15. (Germany, July 16, 1929.)
—— Manufacture of vat dyestuffs. 21,550. July 16. (Germany, July 16, 1929.)
—— Manufacture of aminodiazoanthraquinones. 21,689. July 17. (Germany, July 17, 1929.)
—— Manufacture of physiologically-active products. 21,690. July 17. (Germany, July 17, 1929.)
—— Manufacture of artificial fibres, etc., from cellulose derivatives. 21,820. July 18. (Germany, July 18, 1929.)
—— Manufacture of optically active phenyl propanolmethyl amines. 21,821. July 18. (Germany, July 19, 1929.)
Imperial Chemical Industries, Ltd., Fertilisers. 21,278. July 14. (United States, July 15, 1929.)
—— Fertilisers. 21,279. July 14. (United States, July 13, 1929).
—— Fertilisers. 21,653. July 17.
—— Manufacture of fertilisers. 21,742. July 18. (United States, July 20, 1929.)
Knoll Akt.-Ges. Chemische Fabriken. Production of di-substituted tetrazols. 21,835. July 18. (Germany, May 20.)
Newport Co. Anthraquinone vat dyes, etc. 21,811. July 18. (United States, August 8, 1929.)
Ormandy, W. R. Recovery of sulphur from products obtained in treatment of mineral oils, etc. 21,523. July 16.
Society of Chemical Industry in Basle. Manufacture of azo dyestuffs. 21,819. July 18. (Switzerland, July 18, 1929.)

White Lead Paint Prosecution

Heavy Penalty for London Firm.

A FURTHER prosecution under the Merchandise Marks Act, 1887, for selling paint wrongly described, and for applying a false trade description, was heard at the Lambeth Police Court on Wednesday, July 16, before Mr. McKenna. The summonses were brought at the instance of the White Lead Section of the London Chamber of Commerce, against the Hamilton Trading Co., Ltd., Peckham, London. The defendants answered to four summonses for unlawfully selling a mixture of barium sulphate and other substances, and for applying a false trade description of genuine stack white lead paint.

Mr. Measor, for the prosecution, said their whole object was to show that barium sulphate, known in the trade as barytes, was inferior to white lead, and if people were getting something of which the pigment consisted of barium sulphate, they are not getting the right thing. On January 27 this year, two calls were made on the defendants' premises, asking for 14-lb. tins of white lead paint. This was subjected to an analysis, and a letter was written to the defendants saying that over 90 per cent. of the pigment consisted of barium sulphate, zinc sulphide and zinc oxide. About two weeks ago there was a prosecution against the defendants at the Tower Bridge Police Court for a similar offence, when they were fined £15 and £25 costs.

Mr. White, for the defendants, said that his clients were severely dealt with by the magistrate on the previous occasion, and heavily mulcted in costs, and he could assure the Court there would be no further infringement of the Act.

Mr. McKenna imposed a fine of £15 and £15 15s. costs on the first summons, and 1s. each on the other three.

Centenary of Belgian Independence

FROM the London offices of the Belgian National Railway we have received an attractive poster and a number of folder pamphlets giving particulars of the festivals and events that are being held this year in various parts of Belgium to celebrate the centenary of Belgian independence. Since the war the ties between Great Britain and Belgium have been strengthened in many ways, and the interchange of visitors has greatly developed. This year is a particularly favourable season for visiting Belgium for holiday purposes, and the Belgian National Railway Offices at 47, Cannon Street, London, are offering special facilities for cheap and convenient travel.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID, CHROMIC.—1s. 0½d. per lb. d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot £20 to £25 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 11d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9½d. and 10d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 10s. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall. pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4½d. per lb. nett d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2 cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS.—3¾d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.b. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3¼d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in returnable casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—7d. to 7½d. per lb. Crude 60's 1s. 11d. to 2s. per gall. July/December.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 4d. per gall. B.P., 5s. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Refined, 2s. 7d. to 2s. 10d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s. Dark, 1s. 6d. to 1s. 8d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5¼d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 1s. 11d. per gall. Pure, 1s. 11d. to 2s. 3d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 6½d. to 6¾d. per gall. Home, 4d. per gall. d/d. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 1½d. to 1¾d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 8¾d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 6d. per gall. Solvent 90/190, 1s. to 1s. 2½d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £4 10s. per ton. Hot pressed, £8 per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Flaked, £14 to £15 per ton.

PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID GAMMA.—Spot, 3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 5d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8½d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8½d. per lb. d/d buyer's works.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.

o-CRESOL 30/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34·5° C.—1s. 9¼d. per lb., in ton lots.

DICHLORANILINE.—1s. 10d. per lb. f.o.r. works.

DIMETHYLANILINE.—Spot, 1s. 9½d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—8d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7½d. per lb.; 66/68° C., 9d. per lb f.o.r. works.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb, 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—Spot, 1s. 6½d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 9d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 1d. per lb. ex works.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—4s. 10½d. to 5s. 3d. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON BLACK.—4d. to 4 1/16d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 9d. per lb.
LITHOPONE, 30%.—£20 to £22 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
ZINC SULPHIDE.—8d. to 11d. per lb

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton, ex wharf London, barrels free.
ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., for synthetic product, according to quantity. Solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 6d. to 1s. 6¾d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 1¾d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb.
BISMUTH CARBONATE.—6s. 6d. per lb.
BISMUTH CITRATE.—6s. 9d. per lb.
BISMUTH SALICYLATE.—6s. 7d. per lb.
BISMUTH SUBNITRATE.—5s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 4s. 4d. per lb.
BISMUTH OXIDE.—8s. 6d. per lb.
BISMUTH SUBCHLORIDE.—8s. per lb.
BISMUTH SUBGALLATE.—6s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0¼d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 5½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 8d. per lb. Prices for 1 cwt. lots.
CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., in 1-cwt. lots.
CAMPHOR.—Refined flowers, 3s. to 3s. 2d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 5d. per lb. for 28 lb. lots. Green, 3s. 1d. per lb., list price. U.S.P., 2s. 4d. to 2s. 7d. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 17s. per lb. net; Synthetic, 9s. 6d. to 11s. per lb.; Synthetic detached crystals, 9s. 6d. to 11s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb
METHYL SULPHONAL.—18s. 6d. to 20s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENAZONE.—5s. 6d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—91s. 6d. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 3d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125 lb. kegs
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—43s. 6d. per lb.
SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.
SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—1s. 11d. per lb., B.P.C. 1923, and U.S.P. IX—2s. 3d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—9s. 6d. to 10s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 8s. 3½d. to 9s. 2d. per lb., according to quantity. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—12s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL CINNAMIC ALDEHYDE.—10s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—7s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.
COUMARIN.—11s. per lb.
CITRONELLOL.—8s. per lb.
CITRAL.—8s. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—9s. 3d. per lb.
GERANIOL (PALMAROSA).—17s. per lb.
GERANIOL.—7s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. per lb.
ISO EUGENOL.—11s. 6d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—9s. per lb.
RHODINOL.—46s. per lb.
SAFROL.—2s. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—13s. to 15s. per lb. Ex Guaiaco 12s. 6d. to 13s. 9d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.
ANISE OIL.—5s. per lb.
BERGAMOT OIL.—10s. 3d per lb
BOURBON GERANIUM OIL.—21s. per lb.
CAMPHOR.—Brown, 1s. 9d. per lb.
CANANGA.—Java, 9s. per lb.
CASSIA OIL, 80/85%.—4s. 9d. per lb.
CINNAMON OIL LEAF.—6s. 9d. per oz.
CITRONELLA OIL.—Java, 2s. 6d. per lb., pure, Ceylon, 2s. 6d. per lb., c.i.f. U.K. port.
LEMON OIL.—5s. 6d. per lb.
PEPPERMINT OIL.—English, 55s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, July 24, 1930.

PRICES have remained steady during the current week with a fair amount of business, although on the whole conditions are still quiet.

General Chemicals

ACETONE.—In steady demand at £71 10. to £80 per ton according to quantity.

ACID ACETIC.—Steady and in good demand at £36 10s. per ton for 80% technical and £37 for 80% edible.

ACID CITRIC.—Quiet at 1s. 6½d. to 1s. 7d. per lb., less 5%.

ACID LACTIC.—Firm at £42 per ton for the 50% by weight, pale quality, and in steady request.

ACID OXALIC.—The improved demand continues at £30 7s. 6d. to £32 per ton according to quantity.

SULPHATE OF ALUMINA.—Unchanged at £8 to £8 15s. per ton for the 17/18% iron free quality.

ARSENIC.—Quiet at about £15 15s. per ton, free on rails at mines.

CREAM OF TARTAR.—The slightly better demand is maintained, with price at about 90s. to 92s. per cwt., ex wharf London.

COPPER SULPHATE.—Unchanged at £21 to £22 per ton, free on rails.

FORMALDEHYDE.—In steady demand at £32 per ton.

LEAD ACETATE.—White £40 per ton, brown £39 per ton, and still rather quiet.

LEAD NITRATE.—£30 to £32 per ton.

LITHOPONE.—£19 15s. to £23 per ton, according to grade.

CARBONATE OF POTASH.—Steady at £27 per ton for 96/98% arsenic free quality.

PERMANGANATE OF POTASH.—In steady demand and firm at 5½d. per lb., for B.P. needle crystals.

BICHROMATE OF SODA.—Continues at 3⅜d. per lb., with discounts for contracts.

SODA HYPOSULPHITE.—Commercial crystals £8 10s., photographic crystals £14 15s. per ton.

SODIUM SULPHIDE.—Unchanged at British makers' prices.

TARTAR EMETIC.—In a little better demand at about 11d. per lb.

ZINC SULPHATE.—Unchanged at £12 10s. per ton.

Coal Tar Products

There is no change to report in the condition of the coal tar products market from last week. Stocks are diminishing and prices remain steady.

MOTOR BENZOL.—Remains firm at about 1s. 5½d. to 1s. 6½d. per gallon, f.o.r.

SOLVENT NAPHTHA.—Firm at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA.—Unchanged at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL.—Remains at 3d. to 3½d. per gallon, f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Quoted at 2s. per gallon for the 98/100% quality, and at 1s. 10d. per gallon, ex works for the dark quality 95/97%.

NAPHTHALENES.—The firelighter quality is quoted at £3 10s. to £3 15s. per ton, the 74/76 quality at £4 to £4 5s. per ton, and the 76/78 quality at about £5 per ton.

PITCH.—Is worth 37s. 6d. to 42s. 6d. per ton, f.o.b. East Coast port, but little business is being done.

The following additional prices have been received :—

CARBOLIC ACID.—Prices are unchanged at 7d. to 7½d. per lb. There are some indications of secondhand material at lower prices.

CRESYLIC ACID.—Pale 98/100%. Generally quoted at 1s. 10d. to 2s. per gallon with higher grades on offer at 2s. 5d. to 2s. 7d. per gallon.

ACETYL SALICYLIC ACID B.P.—Prices are unchanged at those previously indicated, namely 2s. 9d. to 2s. 11d. per lb.

METHYL SALICYLATE.—Steady at 1s. 3d. to 1s. 5d. per lb. according to quantity, though there are some indications that a cheap continental material is in evidence.

MOTOR BENZOL.—Quoted at 1s. 6½d. to 1s. 7d. per gallon.

PHENOLPHTHALEIN.—Unchanged at 5s. 11d. to 6s. 1½d.

PYRIDINE 90/160.—Quoted at 3s. 9d. to 4s. per gallon according to quantity.

Nitrogen Fertilisers

Sulphate of Ammonia.—Export.—The large producers have not yet announced any prices for the new year, and buyers are holding off pending the announcement. During the week there have been few offerings, and one or two small sellers have raised their price. *Home.*—Only very small business is transacted, as buyers are holding off except when the sulphate is required for immediate consumption.

Nitrate of Soda.—It appears likely that there will be further delay in the announcement of this price. In the meantime there is very little interest in this product.

Latest Oil Prices

LONDON, July 23.—LINSEED OIL moved to lower levels with a fair business at the decline. Spot, £35 10s., quoted; August, £31 7s. 6d., paid and sellers; September to December, £30 5s. paid, and sellers at £30 7s. 6d.; January to April, £29, sellers. COTTON OIL unchanged. Egyptian crude, £27; deodorised £34. TURPENTINE.—American, 6d. to 9d. down. Spot, 35s. 6d.; August, 35s. 6d.; September to December, 36s. 3d. per cwt.

HULL.—LINSEED OIL.—Naked, closing prices: Spot, £33 15s.; July, £33 5s.; August, £32 15s.; September to December, £31 10s.; January to April, £30 5s. COTTON OIL.—Naked, Egyptian crude, spot, £28; edible refined, spot, £31; technical, spot, £30 10s.; deodorised, spot, £33. GROUNDNUT OIL.—Crushed extracted, spot, £31; deodorised, spot, £35. PALM KERNEL OIL.—Crude, naked, 5½ per cent., spot, £28 5s.; SOYA OIL.—Extracted and crushed, spot, £27 15s.; deodorised, spot, £31 5s. RAPE OIL.—Crushed extracted, spot, £33 10s.; refined, spot, £35 10s. per ton. TURPENTINE.—Spot, 38s. 6d. per cwt. CASTOR and COD unaltered. Net cash terms, ex mill.

Scottish Coal Tar Products

TRADING has been slow during the week owing to the holidays which are now in force. Quotations for almost all products are easy and stocks are gradually increasing.

Cresylic Acid.—There are many inquiries circulating, but few orders. Pale 99/100%, 1s. 10d. to 1s. 11d. per gallon; pale 97/99%, 1s. 9d. to 1s. 10d. per gallon; dark 97/99%, 1s. 8d. to 1s. 9d. per gallon; high boiling, 1s. 9d. to 1s. 11d. per gallon; all f.o.r. makers' works in bulk.

Carbolic Sixties.—Makers are having to hold their supplies owing to the lack of demand. The value is about 2s. to 2s. 2d. per gallon for ordinary grades.

Creosote Oil is commanding little attention, and prices are unschanged. Specification oil, 3d. to 3½d. per gallon; gas workr ordinary, 3¼d. to 3½d. per gallon; washed oil, 3¼d. to 3½d. pe gallon; all ex makers' works in bulk.

Coal Tar Pitch.—More inquiries are circulating but buyers are not in any hurry to contract for forward delivery. Nominal value remains at about 47s. 6d. per ton f.a.s. Glasgow for export and about 50s. per ton f.o.r. works for home trade.

Blast Furnace Pitch is quiet at controlled prices, namely: 30s. per ton f.o.r. makers' works for home trade and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—The output is steady and quotations remain firm at 3½d. to 4d. per gallon filled into buyers' packages at makers' works.

Blast Furnace Tar is 2¾d. per gallon f.o.r. works.

Crude Naphtha.—The production continues small and value remains at about 4d. to 4½d. per gallon f.o.r.

Water White Products are finding a limited outlet only and stocks are gradually accumulating. Motor benzol, 1s. 6½d. to 1s. 7d. per gallon; solvent naphtha 90/160, 1s. 3d. to 1s. 4d. per gallon; heavy solvent 90/190, 1s. 1d. to 1s. 2d. per gallon; all ex makers' works in bulk.

South Wales By-Products

THERE is very little change in South Wales by-product activities. The call for pitch remains small, supplies being well in excess of the demand. Inquiries, however, are circulating for patent fuel and if expectations in this direction materialise, pitch should be a strong market in the near future. Prices are unchanged at from 43s. to 45s. per ton f.o.b. Solvent naphtha has a fair demand at from 1s. 2d. to 1s. 4d. per gallon, but heavy naphtha is slow around 11d. to 1s. 1d. per gallon. Refined tars have a moderate call, quotations for gasworks and coke-oven tar being unchanged. Road tar has a steady, if moderate, demand round about 13s. per 40-gallon barrel. Motor benzol is steady at from 1s. 2d. to 1s. 4d. per gallon, but creosote has fallen off with a quiet market at from 3d. to 4d. per gallon. Patent fuel and coke exports remain unsatisfactory. Patent fuel prices for export are: 21s. 6d. to 22s., ex-ship Cardiff; 20s. to 21s., ex-ship Swansea, and 20s. ex-ship Newport. Coke prices are: Best foundry, 35s. to 37s.; good foundry, 27s. 6d. to 32s. 6d.; furnace, 21s. to 21s. 6d. Oil imports into Swansea during the month ending July 18 amounted to 9,093,090 gallons.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, July 22, 1930.

THE Scottish heavy chemical market has during the past week still remained active, the bulk of inquiries received being for export business. Prices on the whole remain firm.

Industrial Chemicals

ACETONE B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—Prices ruling are as follows:—Glacial 98/100%, £53 to £64 per ton; pure, £37 10s. per ton; technical 80%, £37 10s. per ton, ex wharf.

ACID BORIC.—Granulated, £22 per ton; crystals, £23 per ton; powder, £24 per ton, packed in 1 cwt. bags delivered free, Great Britain, in 1 ton lots and upwards.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC 80° quality.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC 98/100%.—On offer at the same price, viz., 3¼d. per lb., ex store. Offered from the Continent at 3⅛d. per lb., ex wharf.

ACID SULPHURIC.—£3 2s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC B.P. CRYSTALS.—Quoted 1s. 4d. per lb., less 5% ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE.—Quoted at round about £8 15s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10¼d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton; powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID 880°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Rather easier, and spot material now obtainable at round about £30 per ton, ex wharf. On offer for shipment from China at about £27 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Quoted £18 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f. U.K. ports. For Continental material our prices would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. per ton to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE 40%.—Now quoted £33 10s. per ton, ex store. Continental material now on offer at about £34 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £34 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £53 10s. per ton, c.i.f. U.K. ports.

LEAD, ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 8d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4½d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton, ex store, offered from the Continent at £25 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99½/100% POWDER.—Quoted £25 10s. per ton, ex wharf. Crystals, 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5½d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb., ex wharf.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton, in drums, £18 15s. per ton in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyers' station. Minimum 4-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅞d. per lb. delivered buyers' premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 13s. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers now offer at £10 2s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 55s. per ton, ex works, 57s. 6d. per ton delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Price for home consumption: solid 61/62%, £9 15s.; broken 60/62%, £10 15s. per ton. Crystals 30/32%, £7 17s. 6d. per ton, all delivered buyers' works on contract minimum 4-ton lots. Special prices for some consumers. Spot material, 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; Roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £20 per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Two Million Metal Drums

A YEARLY order of nine thousand tons of steel sheets has been created by the decision to double the equipment at Fawley, Hampshire, for turning out metal drums to hold standard road asphalt. "The development will give employment to iron workers, steel workers, collieries and transport workers," said an official of the Anglo-American Oil Co. in a recent interview. "We are at present turning out 2,000,000 of these drums a year and we have just begun coating the inside of each of them with an acid made by a secret process. This acid attacks the face of the metal and the effect is to produce a thin layer of air between the asphalt and its container, so enabling the drum to be stripped clean which not only gives the road maker an uncontaminated product but saves his time and the material which would otherwise adhere to the surface of the metal."

Potash Producers and the I.G.

AT the stockholders' meeting of the Westeregeln concern, Director Ebeling made the following statement which has caused considerable comment in German trade papers: "The mixed fertilisers now available are far from corresponding to the theoretically ideal composition, which is one part nitrogen, one part phosphoric acid, and two parts potash. Since the manufacturers of mixed fertilisers, including the I.G. Farbenindustrie, give potash such an unfair deal, the potash industry sees itself compelled to take the manufacture of mixed fertilisers in its own hands. This action is also necessary in order to prevent the company from sinking to the level of purveyors of raw materials for the mixed fertiliser plants." This statement is interpreted by the *Zentral Blatt für die Kunstdunger Industrie* as the forerunner of new competition for the I.G. Farbenindustrie.—U.S.A. Consul, Frankfort.

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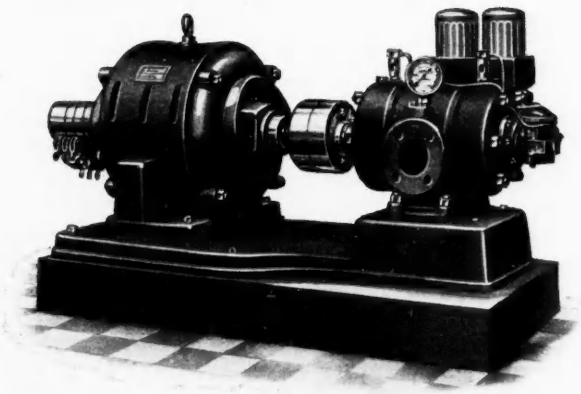

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Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, July 24, 1930.

Patchy conditions have ruled in the market for chemical products here during the past week, with more than one seller describing the week's operations as the quietest for some considerable time. This, however, is not general, and, on the whole, it is probable that sales since the last report have been about up to the average for the present month, although there is no doubt that the holiday season is taking its toll. Hope of any material improvement in the situation is deferred now until about the end of next month at the earliest. So far as prices are concerned, these have been pretty well maintained in all sections and little fresh weakness has to be reported.

Heavy Chemicals

A moderate business is going through in the case of bicarbonate of soda, offers of which are firm at round £10 10s. per ton. There is a quietly steady demand for prussiate of soda at from 4¾d. to 5¼d. per lb., according to quantity. Caustic soda is moving off in fair quantities against contract commitments, which are quoted at from £12 15s. to £14 per ton, according to strength. The demand for saltcake is quiet but values in this section are steady at up to £3 per ton. Bichromate of soda meets with a moderate volume of inquiry, with offers still on the basis of 3¾d. per lb. Chlorate of soda is unchanged on balance at about £24 15s. per ton, and only quiet sales are reported. With regard to alkali, quotations for this material are steady at £6 per ton, a moderate business being done. There is a quietly steady call for hyposulphite of soda, values of which are at round £9 per ton for the commercial grade and £15 5s. for the photographic. Dibasic phosphate of soda is held for about £11 per ton, but the demand for this material during the past week has been subdued. Sales of sulphide of sodium have been of rather limited extent, but there has been little alteration in the price position, the 60-65 per cent. concentrated solid quality offering at round £10 per ton and the commercial at from £7 10s. to £8.

Among the potash products, there is some inquiry about for bichromate which is quoted on the basis of 4¾d. per lb. Yellow prussiate of potash is in moderate request and values keep up at from 6¾d. to 7¼d. per lb., according to quantity. The tendency in the case of carbonate of potash seems to be towards lower levels, current offers being at about £24 10s. per ton. Chlorate of potash is in quiet demand just now, with prices at about £26 per ton. Caustic potash is attracting relatively little attention, but at £29 to £30 per ton quotations show no change. Permanganate of potash is moving in fair quantities and values are well held at about 5½d. per lb. for the B.P. material and 5¼d. for the commercial quality.

A moderate business is going through in the case of arsenic, offers of which keep up at round £15 15s. per ton at the mines for white powdered, Cornish makes. Sulphate of copper is rather slow and prices are weak and uncertain at a top figure to-day of £23 per ton, f.o.b. No more than a quiet trade is passing in the lead products, although there has been no further change in prices, nitrate being quoted at round £29 per ton and white and brown acetate at £36 and £35. Offers of the acetates of lime are at about £7 10s. per ton for the brown quality and from £14 10s. to £15 for the grey.

Acids and Tar Products

A fair movement has been reported both of citric and tartaric acids. The former is quoted at round 1s. 6½d. per lb., and the latter at from 1s. 1d. to 1s. 1½d. per lb. A quietly steady trade is going through in respect of acetic acid, quotations for which are firm at about £66 per ton for the glacial quality and £36 for the 80 per cent. commercial grade. Oxalic acid is maintained at 32s. per cwt., ex store, but buying interest in this material is on quiet lines.

Among the by-products, pitch is quiet still with export quotations nominal at about 47s. 6d. per ton, f.o.b. The movement of creosote oil is of moderate extent, with offers at from 3d. to 4d. per gallon, naked, according to quality. Solvent naphtha meets with fair inquiry and values are steady at from 1s. 2d. to 1s. 2½d. per gallon, naked. Both crude and crystal carbolic are in rather quiet demand, but there has been very little further change in prices, crude 60's being quoted at about 2s. 2½d. per gallon, naked, and crystals at round 7¼d. per lb., f.o.b.

Company News

English China Clays, Ltd.—An interim dividend on the cumulative preference shares at the rate of 7 per cent. per annum for the half year ended June 30 is announced payable on August 1.

W. and H. M. Goulding.—A dividend at the rate of 5½ per cent. per annum on the preference shares and 6 per cent. per annum on the ordinary shares for the year ended June 30, 1930, is announced payable in two equal instalments, on July 31 and December 31 next.

Zinc Corporation, Ltd.—The report for the year ended December 31, 1929, shows that the gross value of mine production amounted to £1,201,061, against £1,168,905, and after deducting expenses, taxes, etc., £1,079,841, as against £1,031,954, and adding income from investments, the net profit amounted to £246,050, compared with £255,534, and there is available £291,072, in contrast with £297,637. The 20 per cent. dividend on the preference shares absorbs the usual amount of £49,138, but the ordinary dividend is reduced to 35 per cent., against 40 per cent. last year. In consequence, the preference shares, which are participating, receive only 15 per cent. additional dividend, compared with 20 per cent. General reserve, however, receives £21,655, against nil last year, and after this allocation and £24,509 on account of mine development and new plant there remains £38,474 to be carried forward, against £45,022 brought in.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal" have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Canada.—A firm of manufacturers' agents established in Toronto is open to undertake the representation of British manufacturers of chemicals and supplies selling to the rubber, paint and similar industries, and basic products in general for industries in Canada. (Ref. No. 80.)

United States.—A U.S. firm desires to represent British manufacturers of carbon blocks for water filtration, filter papers and filter cloths of various kinds, importing on their own account. (Reference No. 69.)

Tariff Change

Germany.—An Order, dated June 30, withdraws, as from August 1, the import licence requirement in respect of crude aluminium (in blocks, bars, pigs and grains), also cast aluminium slabs, imported into Germany. H.M. Ambassador at Berlin reports that the increased duties provided for by the Law of December 22 last in respect of aluminium and aluminium semi-manufactures comes into force on the same date.

"C.A." Query

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—

147. (*Silica*).—A Birmingham correspondent is anxious to get in touch with users of silica in rock form.

New Benn Books

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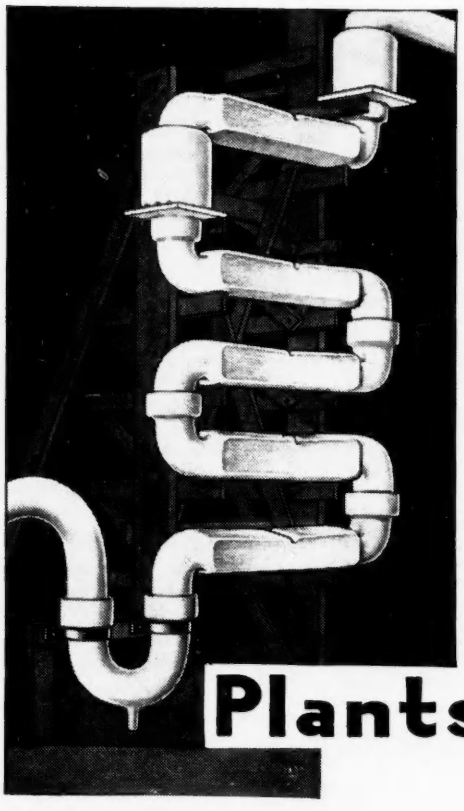

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Metallurgist's Claim

Extraction of Gold from Concentrates

In the King's Bench Division on Monday, Mr. Justice Macnaghten commenced the hearing of an action by Mr. H. E. Arrowsmith, a metallurgist, against the London and Rhodesian Mining and Land Co., of Palmerston House, Old Broad Street, E.C., claiming the sum of £11,000 bonus, alleged to be due under an agreement of December 1, 1924.

Mr. H. D. Samuels, for the plaintiff, said in 1924 his client was approached by the defendants, whose problem it was to extract a higher percentage of gold from certain concentrates coming through their machinery after passing through the mineral separation plant. Plaintiff was then a consultant metallurgist at Durban, and the defendants had a number of mines in South Africa. Plaintiff made two reports to the defendants. The agreement was that plaintiff got a salary of £1,050, there being a provision for payment to the plaintiff of a small bonus on the results of any metallurgical improvements adopted by the defendants at his suggestion. Plaintiff's case was that he made improvements, which were adopted by the defendants, with considerable success, and resulted in large revenues. Plaintiff said that the bonus clauses of his contract operated with regard to those revenues at a figure of five per cent. Plaintiff left defendants' employ in April 1928, his health having completely broken down.

Defendants, by their defence, denied that the revenue of a mine, associated with them, was due to improvements suggested by the plaintiff. Their case was that, following the reports submitted to them by the plaintiff prior to the agreement of December, 1924, another representative of the company dealt with the matter and suggested improvements which increased revenue. Defendants also denied that the increase of revenue was due entirely to such improvements.

The Judgment

His Lordship, in the course of his judgment, said the agreement of employment made by the defendants, with the plaintiff, contained a clause that he was to be entitled to a commission or bonus on any improvements introduced in the mines by the plaintiff for the better means of extracting gold from ore. The question he had to consider was what was the true construction of that clause, and further what sum, if any, was payable to him in the circumstances of the case. Plaintiff received his salary and he made no claim for a bonus till after his services came to an end. The clause in the agreement said that the plaintiff was to receive in addition to his salary a small bonus on the results of any metallurgical improvements adopted by the company, for which the plaintiff was responsible. Defendants suggested a limitation of the clause, but his Lordship saw no reason for putting upon the clause the limitation suggested by the defendants. The clause must be read as referring to the proposals put forward by the plaintiff in his report of September, 1924, if and so far as they were adopted by the company and if and so far as they were improvements for the working of the Cam Co. Were the proposals adopted and were they improvements? In his Lordship's opinion they were adopted. With regard to being improvements, they were not so far as the refinery part were concerned. With regard to the blast furnaces suggested by the plaintiff, the reports showed that in 1926 and other years there was an enormous increase in the extraction of gold due, the defendants said, to the antimony treatment suggested by the plaintiff. It was a plain statement that the installation of the blast-furnace had been a success, and resulted in increased revenue, due to the treatment in the blast furnaces suggested by the plaintiff. In those circumstances, plaintiff had made good his claim that the blast furnace treatment was a metallurgical improvement on the methods of the company. In his Lordship's opinion, in consequence of the adaptation by the Cam Co. of the proposals made by the plaintiff, the Cam Co. in fact got £60,000 they would not otherwise have got at all and that was the result of the metallurgical improvements proposed by the plaintiff and adopted by the company. The plaintiff was therefore entitled to a "small bonus on the results of the improvements," and his Lordship construed that as meaning a reasonable sum, but it was to be small—not excessive. He had come to the conclusion that the company had derived a net profit of £60,000 from the plaintiff's improvements. He assessed the sum due to the plaintiff in a lump sum, viz., £1,400.

Judgment for the plaintiff for £1,400, with costs.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debt due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

ENDOCRINES, LTD., London, W., manufacturers of medicinal preparations. (M., 26/7/30.) Registered July 12, £500 debentures, part of £5,000; general charge (except property at Watford, on which they are a second charge). *Nil. March 31, 1929.

NEAR EAST PETROLEUM CO., LTD., London, E.C. (M., 26/7/30.) Registered July 11, £12,000 debenture, to H. H. Rushton, Oakdene, Arkley; general charge. *Nil. April 3, 1930.

THAWPIT EXPORTS, LTD., London, W.C., chemical manufacturers. (M., 26/7/30.) Registered July 9, debenture, for £1,300 and £130 premium, to F. Lewis, 16, Carlton Road, Putney; general charge.

Satisfaction

SERRE (ACHILLE), LTD., London, E., dyers and cleaners. (M.S., 26/5/30.) Satisfaction registered July 11, £3,400, registered November 8, 1922.

Angela Nitrate Co.

Savings Expected from Chilean Merger

Mr. T. T. Aikman, speaking at the 29th annual meeting of the Angela Nitrate Co., Ltd., held in London on Thursday, July 17, said that under the new régime of the merger company he was convinced that the savings in the form of cheaper production through concentrating production in fewer oficinas, the elimination of West Coast agents, and other economies, will amount to at least £1 per ton. As the export duty of £2 10s. per ton will be taken off, whereas only 15s. per ton, in the form of subsidies, was returned to the producers during the past year, the total annual outgoings which will be saved to the producers should reach about £2 15s. per ton, or about £6,875,000 if sales amount to 2,500,000 tons.

Dealing with the absence of a final dividend of the Angela company, the Chairman (Mr. H. W. Morrison) said when they declared an interim dividend they were justified in believing that the average price obtained for their nitrate during the year would be made up by Government subsidies to 17s. for January-June and 16s. 8d.-16s. 9d. for July-December, but, in actual practice, they had only taken an average price in their accounts of 16s. 10d. and 16s. 2d. Furthermore, the cost of production proved to be somewhat higher than was estimated.

At an extraordinary general meeting a resolution was passed extending the duration of the company for a further period of thirty years to run from September 13, 1930.

Ramsay Memorial Fellowships Trust

The Ramsay Memorial Fellowships Trustees have made the following awards of new Fellowships for the session 1930-31: Mr. W. R. Angus, M.A., B.Sc., a Fellowship of £300, tenable for two years at University College, London; Mr. K. Krishnamurti, M.Sc., D.Sc., a Fellowship of £300, tenable for one year, at University College, London; Mr. James Bell, B.Sc., Ph.D., a Glasgow Fellowship of £300, tenable for two years, at University College, London; Dr. A. Girardet, a Swiss Fellowship of £300, tenable for one year, at the University of Edinburgh.

The Trustees have renewed the following Fellowships for the same session: Dr. H. Erdtman (Swedish Fellow), University College, London; Dr. A. Klinkenberg (Netherlands Fellow), University of Cambridge; Professor Y. Nagai (Japanese Fellow), University College, London; Dr. Lloyd M. Pidgeon (Canadian Fellow), University of Oxford.